McGRAW-HILL INTERNATIONAL

Management Digest

TECHNICAL • INDUSTRIAL • COMMERCIAL

MAY 1956

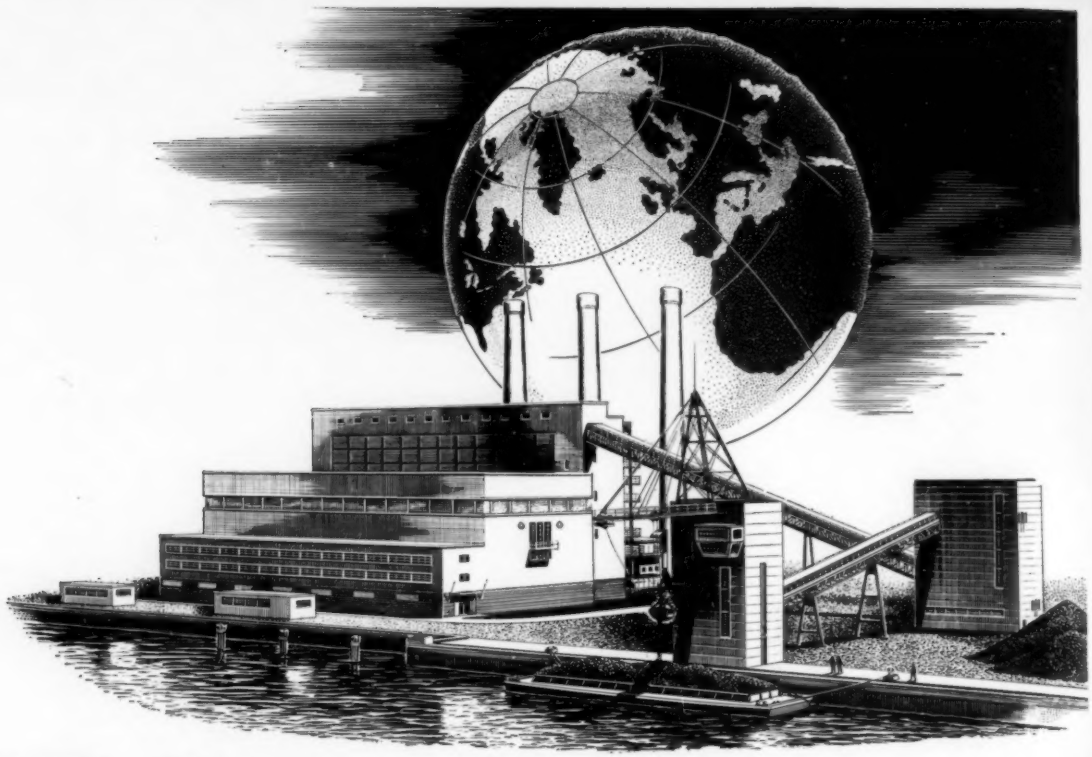
OVERSEAS EDITION

Tomorrow's Cutting Tools

CERAMICS MEAN MORE PROFIT FOR METALWORKING

PAGE 20

India plans; the world watches—p11
TV: the revolution in selling—p18
How to prepare for trouble—p34



C-E's Part in World Power Expansion

The pressing need for power in recent years has resulted in the most remarkable expansion of generating facilities the world has ever seen. New plants—and additions to existing plants—are springing up, literally, in every corner of the globe.

It is a source of real pride to Combustion not only that C-E equipment has international recognition but also that it has helped to bring low-cost electric power to so many industries . . . so many people. The extent of C-E's part in present-day power expansion programs throughout the world is revealed by our 1955 record of activity as summarized below.

• • •

C-E EQUIPMENT INCLUDES:

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The development by Allis-Chalmers of a fundamental new principle of power application enables the popular Model WD-45 diesel tractor to pull implements of much larger size and greater capacity. This new principle operates in conjunction with the exclusive TRACTION BOOSTER system of weight transfer.

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These include 10-ft. (3.05 m) and 12½-ft. (3.81 m) double-action disc harrows; a heavy-duty, 4-blade disc plow (upper photo); and a 4-bottom moldboard plow — all big, husky implements with SNAP-COUPLER hitch and pulled from a single attaching point on the tractor.

For complete information on this modern diesel tractor and the new and heavier implements which can now be used with it, consult the Allis-Chalmers farm equipment dealer in your area.

ALLIS-CHALMERS, EXPORT DEPARTMENT MD556
TRACTOR DIVISION, MILWAUKEE 1, U. S. A.

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Allis-Chalmers Model WD-45 Tractor and the new hydraulically-operated 4-blade disc plow. The plow attaches by means of the SNAP-COUPLER hitch.

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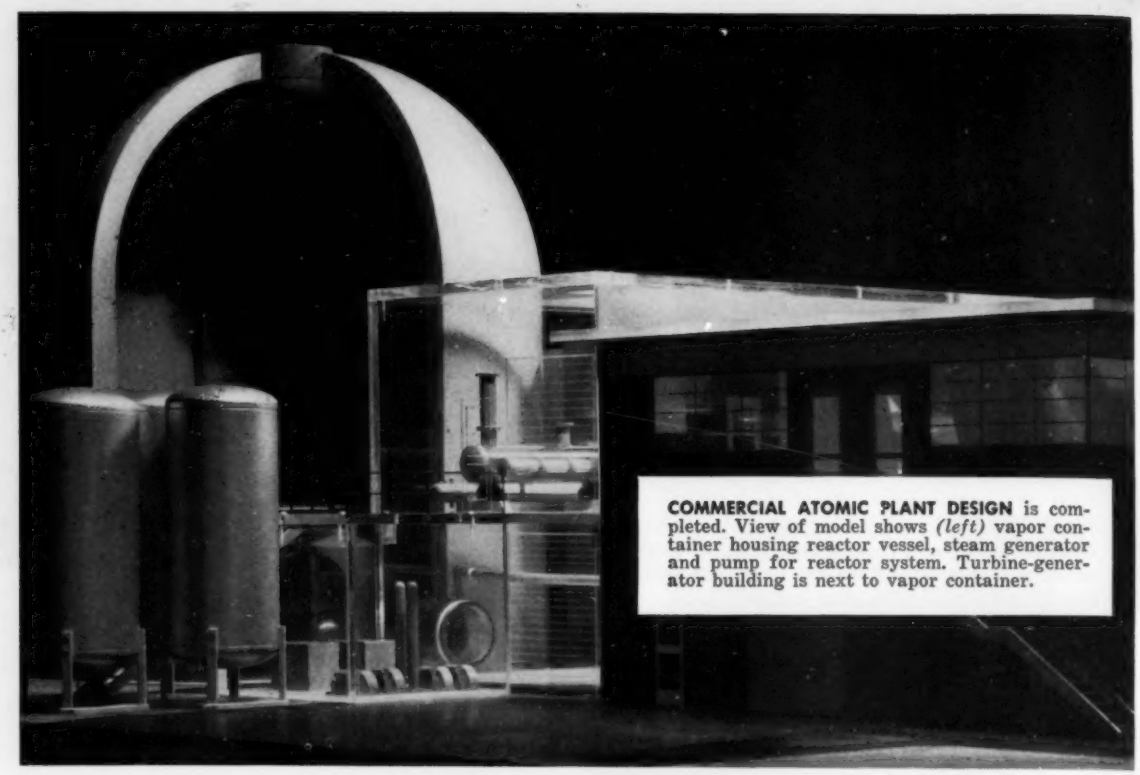

COMMERCIAL ATOMIC PLANT DESIGN is completed. View of model shows *(left)* vapor container housing reactor vessel, steam generator and pump for reactor system. Turbine-generator building is next to vapor container.

ATOMIC POWER IS AVAILABLE NOW

ALCO'S atomic power plants are already designed and engineered; the first is now being built; commercial models can generate stable and economical power

ALCO's atomic power plant is not a dream of the future. It's a reality. The first unit, now being built, will be in operation by early 1957, and similar ALCO atomic plants can be purchased to generate commercial power.

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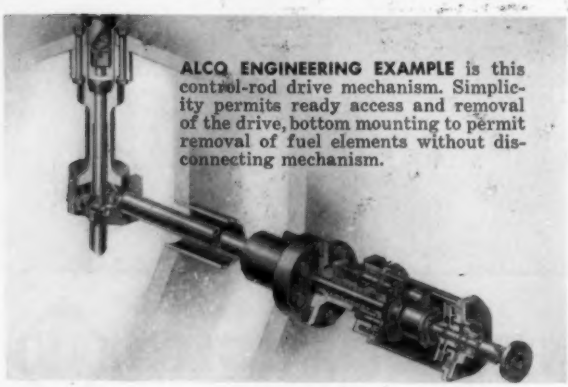

ALCO ENGINEERING EXAMPLE is this control-rod drive mechanism. Simplicity permits ready access and removal of the drive, bottom mounting to permit removal of fuel elements without disconnecting mechanism.

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Your Worthwhile Reading for May 1956:

WORLD BUSINESS

Making a New Economy in India..... 11
Motors Make New Markets..... 13
Dealing with Moscow: $600-million at 2½%..... 14
Chemical Frontier in the Americas..... 15
Japan Speeds Tool Building..... 16
Nordhoff: "Genius—and Dictator"..... 16

MARKETING

TV Sells Goods Like Magic..... 18

NEW PRODUCTION TECHNIQUES

Ceramics: Now They Cut Steel..... 20
Looking Ahead in Production..... 22
Turbo Challenges Rotary..... 23
Survey Points Out Automation Trends..... 24
Europe Likes Its Food in Metal Tubes..... 26
Plastic Poles Stop the Woodpeckers..... 26
TV: New Outlet for Electronic Modules..... 29
Can Stainless Grow With Less Nickel?..... 30

MANAGEMENT METHODS

Plan Now—Defeat Disaster..... 34
Instruction Books: Key to Easier "Repeat" Sales..... 36
Getting Your Share of Talent?..... 37
ICI Fights Skill Shortage..... 38
Swedish Company Stays Competitive..... 39

CONSTRUCTION

Plant Plans for the Future..... 41
Trends In Construction..... 42

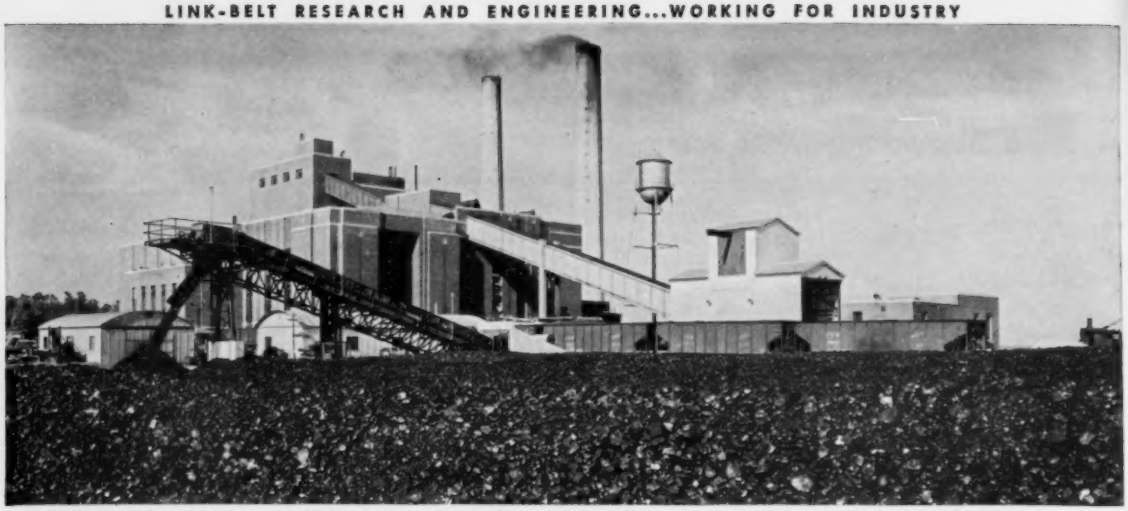
TRANSPORTATION

Coastal Shippers Turn to Wheels..... 43
Europe's Helicopters: Tomorrow's Taxi?..... 44

PLUS . . .

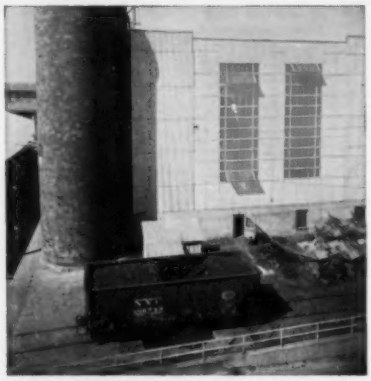
World Trends 7
You 19
Financial Digest 45
Product Digest 46
Management Reading .. 55
The Publisher Says..... 56

LINK-BELT RESEARCH AND ENGINEERING...WORKING FOR INDUSTRY



RECENTLY ENLARGED BY ⅔, this Midwest power plant underwent minimum rearrangement. Coal distribution equipment was extended to serve new bunkers as well as original Link-Belt system installed in 1931. Stacker in yard piles 30,000-ton reserve.

12-HOUR CHANGEOVER to fuel two additional generating units was accomplished in revamping this coal handling system.



SMALL PLANTS restricted in area get expandability plus efficient utilization of initial equipment from Link-Belt designs.

BOOK 2410 has complete data on Link-Belt coal handling equipment plus tested layouts of large and small systems.

Coal handling has room to grow

when Link-Belt provides for low-cost expansion of capacity

THE growth of populations and industry usually demands provision for coal handling expansion in the initial plans of power stations and boilerhouses. Link-Belt has helped meet that need, with consideration for location, transportation facilities, reserve storage needs and other special problems.

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■ Uncomfortable people cost you money. During hot and humid weather they do less work, make more mistakes and generally raise operating expenses in factories, offices and stores.

Keeping those who work for you comfortable, then, is more than a nice gesture. It's good business.

It pays especially when you do it with a low-cost Westinghouse Unitaire—a complete, self-contained air conditioning package that needs no expensive installation. Available in capacities from 2 to 25 tons, the Unitaire usually requires only water, drain and electrical connection, and can be installed quickly, without interrupting your regular business activity.

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For more information about how you can put a stop to "hot weather slowdown" with Unitaire air conditioning, write to me on your company letterhead for free copies of literature BW-5186-A and BW-5187.

J. W. Booker

J. W. BOOKER, *Manager*
Specialty Products Department

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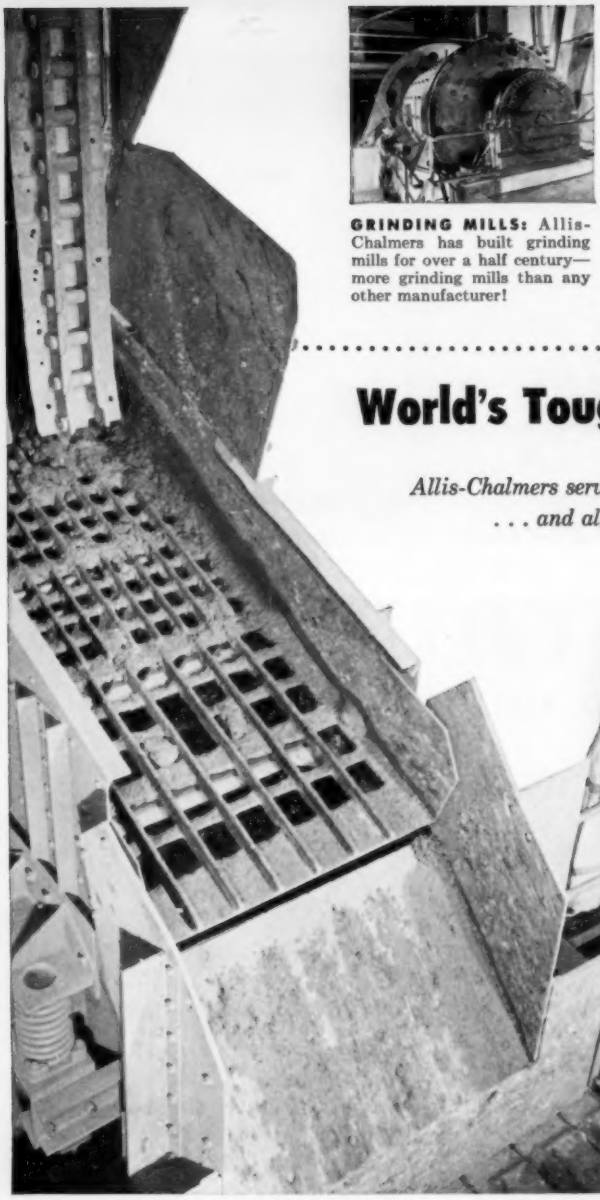

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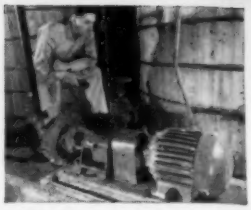

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World's Toughest Screening Operation

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WORLD TRENDS

ECONOMISTS' WARNING . . .

United Nations economists are emphasizing these trends, for governments and businessmen to study, and act upon:

• **Western Europe must reshape its trading policies.** In 1955, imports from the dollar area jumped 40%, while non-dollar buying rose only 4%. Europeans just aren't developing non-dollar markets, says the U.N. It urges them to buy more from non-dollar countries, invest more funds there.

That means that European nations must further reduce barriers against imports of food, textiles, other manufactured goods from areas with lower labor costs (in Asia, Africa, Latin America).

A further U.N. warning: Industrial nations of Europe must invest more in capital expansion. Increasing wages are the villain, soaking up much of the savings that would go into modernization and expansion.

• **Eastern Europe is beginning to correct some of the miscalculations of Stalin's economic development policies.** The U.N. experts report that more attention is being given to coordinating production among the Soviet-bloc countries; more emphasis is going into modernization of existing plants and less on building expensive new ones.

Communist planners are finding out that foreign trade is much more important to the East European nations than to Russia itself. **You can expect efforts to develop stronger export industries in Czechoslovakia, Hungary, Poland, Rumania.**

• **Latin America presents severe problems.** United Nations economists see a trend toward "stagnation" of industrial production, blame it on external payments problems. Nations there may have to further cut down imports of badly-needed capital goods, especially since the price of most goods Latin America sells (coffee, for example) has dropped.

Latin American nations must try harder to expand their exports, mainly by increasing agricultural output. At the same time, the economists urge even faster replacement of imports where possible. **It's a vicious circle:** Replacing imports means building up home industry; that means buying more capital goods overseas; and those capital goods must be paid for with expanding exports.

GERMAN TITANS . . .

• **The trend toward concentration of German industry gets stronger. Note chemicals, and the House of Krupp.**

Bayer, Badische Anilin, and Hoechst—three largest successors to the prewar I. G. Farben trust—have been quietly buying up shares of a fourth, Leopold Casella Co. (Of the 32 "deconcentrated" remnants of Farben, only five remain.) **Some businessmen, watching the powerful recovery of German chemicals in world markets, worry about the reappearance of a single German chemical colossus.**

Alfried Krupp is campaigning hard to avoid selling off his coal and steel holdings. Now the Bonn government agrees, wants to cancel its "anti-concentration" agreements with London, Paris, and Washington.

Meanwhile, Krupp is worried by the expanding Communist-bloc trade activities (page 14). He has proposed a "Point Four-and-a-Half" program to (1) set up an international syndicate of Western companies, with gov-

Turn the page for more WORLD TRENDS

ernments helping to make credit available; and (2) encourage such a pool to sell technical assistance on a low-interest, but profitable, basis to other nations. Krupp's scheme is under serious study.

NEW BOOM?

Suddenly—as it moved into the second quarter of 1956—the $400-billion-a-year American economy appeared ready for a new upward surge.

Business seems exuberant. New surveys indicate for 1956 a 22% increase over last year's record capital spending of $28.7-billion. Biggest spenders will be durable goods manufacturers and railroads, who expect to invest 40% more in new plant and equipment than they did last year.

Studies of consumer spending attitudes reveal that **Americans appear ready to buy the expensive items—houses, cars, appliances—at the same pace they did in 1955.** Despite the reduction in factory production, first quarter auto sales by dealers were not far below last year's record. Still, dealers' inventories are high, perhaps too high.

Some wonder if the outlook isn't "too good." Confidence turns on the continued good health of one man, Pres. Eisenhower.

Beyond that, some economists fear that a **strong new surge may turn out to be the "bubble" that marks the last phase of a long boom.** Manpower, materials are short; business' demand for credit is moving higher. Pessimists wonder if too much optimism might carry prices up beyond the ability of monetary authorities to hold them in check.

Finally, some observers believe American business isn't paying enough attention to serious international problems.

Few Americans have actually measured the total extent of their private business interest overseas. It's larger than they, and the world, realize.

Usually, the importance of American private industry's foreign stake is measured in exports, at some $14-billion yearly. But you must add to that the total amount of foreign sales by American enterprises operating outside the U.S.A. **One respected economic analyst estimates that figure at about $30-billion a year.**

Thus, total foreign sales of American business are around $44-billion—equivalent to the gross national product of the United Kingdom, and 7% greater than American spending on defense and national security.

MATERIALS . . .

Look at a cross-section of important industrial materials and you see a continuing pattern of high price, high demand.

Copper was the big news as MANAGEMENT DIGEST went to press. The high peak price had broken as demand suddenly slipped in Europe. Observers say: "A more healthy situation." But, looking ahead, many expect **a price rebound, or at least a steady holding at present high levels.**

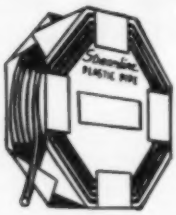
Nickel: Military demands, and the U.S. strategic stockpile, are eating up supply. Civilian buyers are squeezed into "premium" markets, and there is no let-up in sight. . . . **Steel demand** is high in the U.S.A. because businessmen are trying to build inventory—as a hedge against the higher prices they expect to come by summer. Worldwide, steel plates and shapes will be short and expensive for months.

Rubber: the price of natural rubber has slumped 40% in three months, due partly to lower auto production and the sharp rise in synthetic rubbers' uses. Laboratories everywhere are trying to develop new products, new processes for natural rubber in its battle against man-made. . . . **Aluminum** prices are on the way up worldwide as production lags behind demand. Still the spread between aluminum and copper prices encourages substitution—when businessmen can find the aluminum.

Products of the MUELLER BRASS CO.

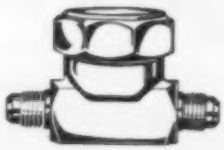
MUELLER BRASS CO. STREAMLINE PRODUCTS

for heating and plumbing—refrigeration and air conditioning



FLEXIBLE PLASTIC PIPE

STREAMLINE SOLDER-TYPE FITTINGS



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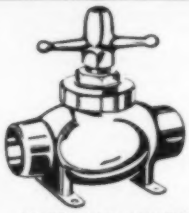
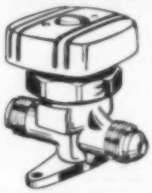


PACKED LINE VALVES



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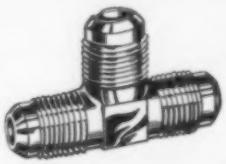
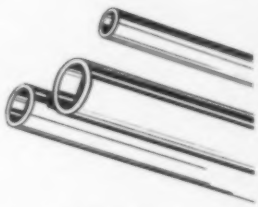


FLARE FITTINGS

DRIERS-STRAINERS

FORMED COPPER TUBE



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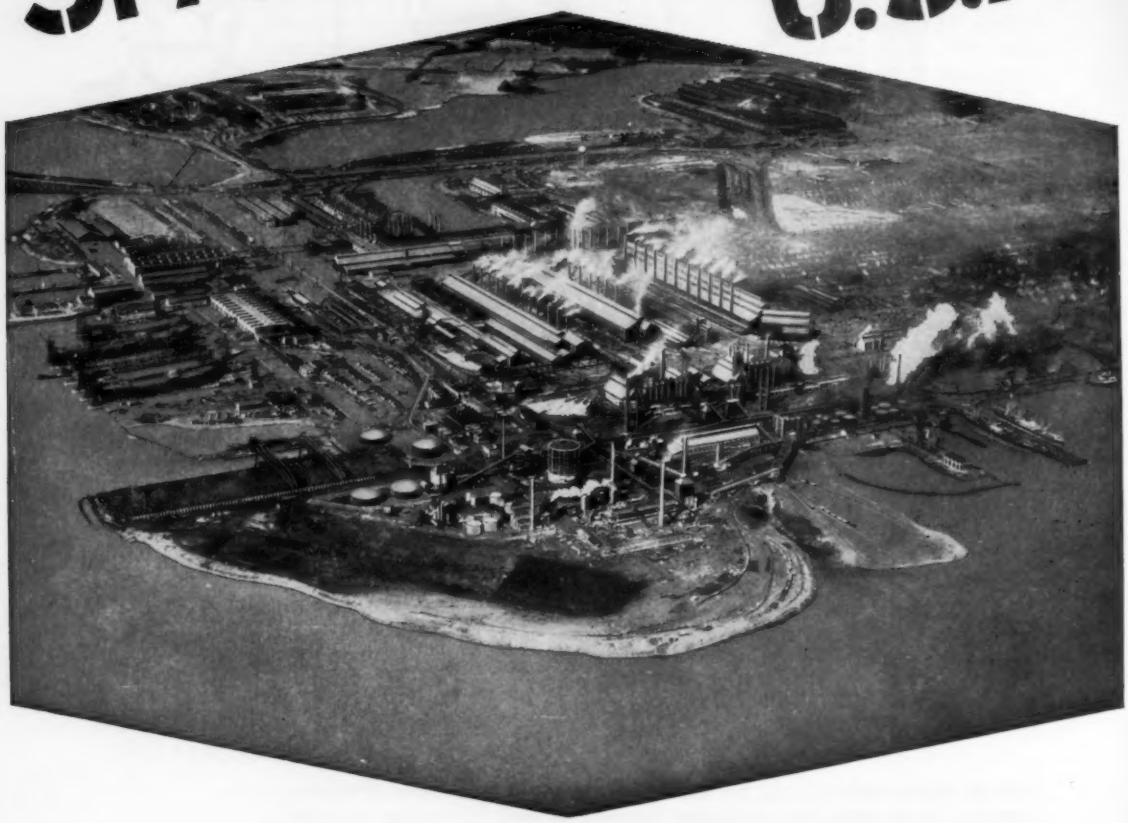

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McGRAW-HILL INTERNATIONAL

Management Digest

MAY 1956
VOL. 11—NO. 5

INDIA'S $15-BILLION FIVE YEAR PLAN AIMS AT	NOW	THESE TARGETS 1961	
Food grains (MILLION TONS)	65.0	**75.0**	**up 15%**
Cotton (MILLION BALES)	4.2	**5.5**	**up 31%**
Irrigated land (MILLION ACRES)	67.0	**88.0**	**up 31%**
Electricity capacity (MILLION KILOWATTS)	3.4	**6.8**	**up 100%**
Iron ore (MILLION TONS)	4.3	**12.5**	**up 191%**
Finished steel (MILLION TONS)	1.3	**4.3**	**up 231%**
Aluminum (THOUSAND TONS)	7.5	**25.0**	**up 233%**

Making a New Economy in India

Digested from BUSINESS WEEK, April 7, Special Report; THE ECONOMIST, (London) Feb 25, p516; Mar 3, p554

This month, Prime Minister Jawaharlal Nehru (above) presents to the Indian parliament the nation's second Five Year Plan. The entire world will be watching.

Free Asia, comments *The Economist*, has produced nothing more important since the war, for this is the crucial economic plan upon which turns the future of a subcontinent. If it succeeds, India's subsequent plans will be successively easier, and the way will be opened to democratic prosperity. If it fails, India may turn to other methods to get the necessary sacrifices from its people.

The rest of Asia, and no doubt underdeveloped economies everywhere, will learn the lessons of failure as they will copy success.

The second Five Year Plan is big, calling for investment of $14.91-billion. It is big because India's economic problems are staggering. It is big because India is in a hurry. Nehru and his advisers are determined to industrialize India. And they aren't prepared to await the long historical process that brought the Industrial Revolution in the West.

The job, Indian leaders believe, is almost entirely up to government. The government must (1) provide most of the investment capital; (2) manage almost all basic industry; (3) control the economy through state planning. They are prepared to leave a share of the economy to private business, but far less than it had under the first Five Year Plan.

Nehru believes that India can learn from the Soviet Union; he feels Russian progress is proof of what state planning can do; he sees India facing problems much more similar to those Russia faced in 1918 than those the U. S. A. and Britain met in the 19th Century.

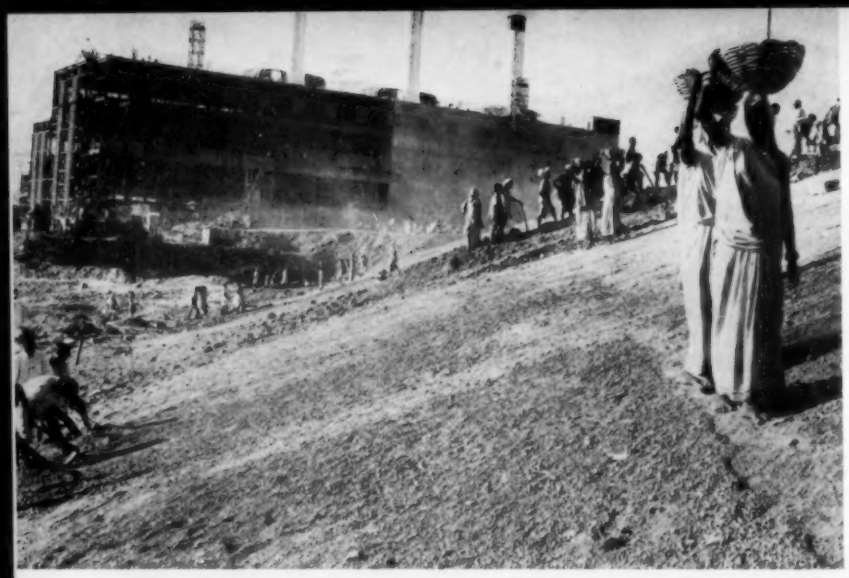
But Nehru insists that India does not have to sacrifice individual political liberties, as communism has done. He has faith that, somehow, India can find a synthesis of Western capitalism and Soviet communism.

Nehru is walking a tightrope, in the opinion of *Business Week*. His critics believe that to achieve rapid industrialization, Nehru is in danger of pushing his country so hard that drastic economic controls may be necessary. And such controls might lead into totalitarianism, crushing the democratic ideal in India.

In a sense, a great competition is underway, between the two largest (in terms of population) nations on earth. Communist China has chosen the political and economic path marked out by Russia. India has chosen something else.

In 1947, India's leaders inherited a country from the British which was split in two. There was urban, industrial India. But there was also "village" India, with 85% of the population, weighing down the other. Per capita income was less than $50 yearly; agricultural yields were among the lowest in the world. Partition made economic problems worse.

The new government's reply was



NEW POWER PLANT: In five years, India must double electrical capacity.

the first Five Year Plan, aimed primarily at raising food production. The effort was successful. Last year, India produced 11-million tons more foodgrains than in 1949-'50; had 7 million more acres irrigated. India's agricultural performance has been spectacular.

Industrial progress has been dramatic, especially in the area of private industry. In the "public," government sector, important progress has been made after a slow start. For example, electrical generating capacity has risen from 2.3-million kilowatts to 3.4-million. All told, economists estimate that the first plan raised India's national income by 15%, with a net per capita income increase of 8%.

That is in spite of India's enormous population growth. Each morning, India sits down to breakfast with 12,000 more mouths to feed. Even with the 4.5-million new jobs created during the first plan, unemployment gets worse.

India must move faster, say the planners, create a strong, broad industrial base on which to grow. And purchasing power must be put into the hands of the masses, to build a market for the goods industry can produce.

Hence the second Five Year Plan. The targets (chart, page 11) are ambitious: 2½ times as much steel, 63% more coal, twice today's electrical capacity. Foodgrains must increase another 15%, there must be 3½ times the present supply of fertilizer.

A unique aspect of the plan is to reduce rural unemployment, and at the same time supply more consumer goods, by building up India's traditional handicraft industries. A "community development program" hopes to cover all of India's 600,000 villages.

The community program is also one of the principal targets of critics of the plan. They say it will be inflationary, that expanding village industry (hand-loomed textiles, for example) will be difficult, and uneconomic.

The Indian planning commission has not tried to conceal the difficulty in finding money to pay for the plan. Of the total $15-billion, the government is to provide just over $10-billion. That will put a terrific strain on the nation.

Government loans, small savings, borrowings from insurance funds, heavy taxation, foreign aid —all will be required. Some 25% of the total is expected to be financed by printing money. Finally, there is an additional $840-million in the plan for which the planners have thought of no source.

With the government canvassing so many sources of capital, many observers fear that private business will have a hard time finding the $4.83-billion it is supposed to invest before 1961.

Financing the tremendous amounts of capital goods imports needed under the plan presents another problem. For example, the four big steel mills now in the planning stage will require perhaps $500-million worth of machinery from abroad.

The government estimates that the country will run a foreign exchange deficit of $1.68-billion over the five-year period. And that estimate is made after subtracting the earnings of Indian exports, and including the drawing-down of sterling credits in London and a hoped-for inflow of foreign funds.

India looks for aid from a number of sources—international agencies, assistance from other governments, trade credits for some of the large industrial projects, and so on. India has gotten a good deal of this help. The World Bank has loaned $125-million since 1947; the U. S. has given, or loaned, nearly $500-million; British, Germans, and Russians are extending credits.

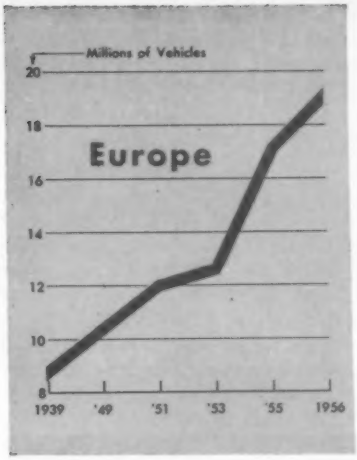
The most frequent criticism of the second Five Year Plan is that it is far too big. Further, some members of the business community in India worry about what they believe is a shift away from the Indian ideal of a "mixed economy," made up of a large private enterprise sector and a smaller state-owned area. These businessmen fear that the plan as it now stands is a victory for those who want—eventually—total state control.

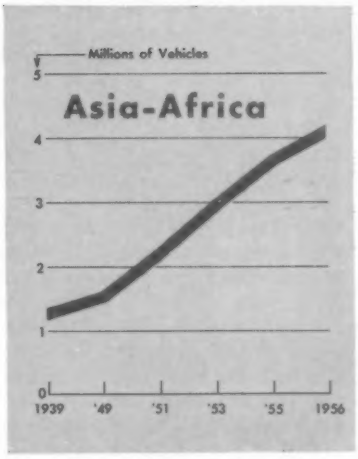
The businessmen worry about the recent nationalization of life insurance in India. They worry about the recent suggestion that all mining and mineral development be reserved for the state. They worry that, as a result of stiff taxation plans now being proposed, they will not have the capital to fulfill the private enterprise share of the Five Year Plan. And such a failure might increase pressure for nationalization of more industries.

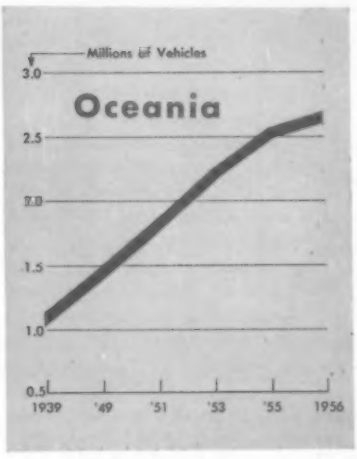
This uncertainty, more than anything else, may hurt India's chances of attracting more large-scale foreign private investment. Investors in the U. S. A. have never been very enthusiastic about ventures in India. British investors are of two minds—some have liquidated, others are putting more money into India. Germans, Japanese, and others, while moving cautiously, are interested in the possibilities. ◀

World on Wheels:

The charts show the number of cars, trucks, and buses in operation on January 1 in these areas . . .

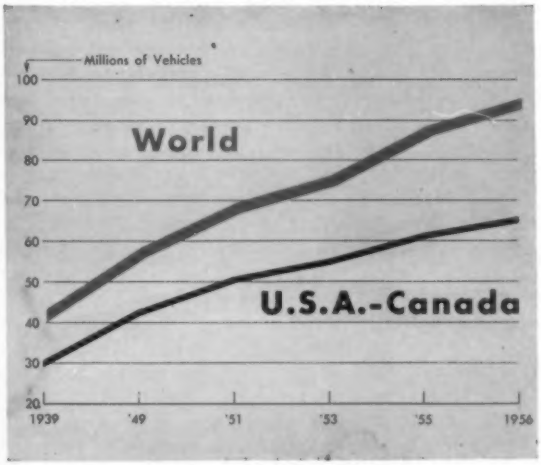






Motors Make New Markets

Digested from THE AMERICAN AUTOMOBILE, May



This month the world's automotive population steps up to have its statistical picture taken, in the annual international motor census of *The American Automobile*. The count: nearly 95-million cars, trucks, and buses, an increase of 7.8% in a single year.

The census has many implications for businessmen. For example, fast growth of vehicle population:

• **Reflects increasing ability of people** everywhere to satisfy their desire for better transportation. Yet unsatisfied demand will keep growing. As more people own cars, others are going to insist that their own standard of living provide them with cheaper, easily-maintained autos.

• **Increases the effect of the motor industry** on national economies everywhere. The industry must have more skilled labor, more automatic machinery, more—and lower-cost—raw materials, more gasoline or diesel fuel, new metals, new designs.

• **Points to new opportunities for business.** More

vehicles require more repair facilities, gas stations, insurance services, roadside businesses (like "motels" or resthouses), and—above all—more highways. Road construction is the most costly and difficult factor in today's "motor economy." Governments can have this consolation, though: More vehicles, burning more fuel, mean higher tax revenues to help pay for the highways.

Thus the motor vehicle industry more and more becomes a powerful generator of business activity.

Production in 1955, says *The American Automobile,* broke records everywhere. In all, there were 12.75-million new cars, trucks, and buses produced. Of these, 45% went to replace old, worn-out vehicles; 55% went to expand the total. So the average age of vehicles is steadily declining, and maintenance needs are in the process of changing.

If you exclude North America, whose huge auto population heavily weights the percentages, Europe, Asia, and Africa show the highest percentage growth—each over 12%. Latin America showed the smallest gain, possibly because of import difficulties in several countries.

Buses showed the largest increase, with an 8.3% rise in registrations, compared to 8.2% for cars and 6.3% in trucks. And while they are not included in the charts (preceding page), tractors showed a strong increase of almost 10% over the year, to a total of 8.1-million.

The American Automobile also has classified production by manufacturers. Excluding the large American companies (General Motors, Ford, and Chrysler) the world "Big Five" manufacturers are:

British Motor Corp.	468,943
Volkswagenwerk	330,120
Ford of England	307,000
Renault	221,000
Fiat	218,000

One special feature of the 1956 census is a new set of figures on Soviet bloc production. The total last year (including China) was an estimated 737,525 units, many more trucks than cars and buses. The total vehicle population is believed to be around 3.6 million, with Russia itself accounting for 2.9 million. Of Russia's total, 2.5 million are thought to be trucks. ◄

Dealing with Moscow: $600-million, at 2½%

Digested from BUSINESS WEEK, Mar 24, p68

Until last summer's "summit" meeting at Geneva, the Soviet bloc countries were virtually sealed off economically from the rest of the world. Since then, they have made it clear that they don't consider themselves sealed off any longer. Hardly a month goes by without another nation receiving propositions from Communist capitals.

In Washington, in London, Bonn, New Delhi, and on to Jakarta, Manila, and Tokyo, government and business officials are studying the significance of the new Communist policy. Few doubt that the Russian economy, second largest in the world, can fulfill many of its promises. Operating a totalitarian system, Communist leaders can manipulate their home economies almost at will, provide whatever exports they need, attach whatever terms to assistance they prefer. And they can cancel agreements abruptly whenever it suits their political purposes.

Within the past year, Russia and the Eastern European satellites have signed, or have offered, trade and economic development deals to more than 15 nations. They have extended roughly $600-million in long-term, low-interest credit (mostly at 2½%). That compares with only a few million dollars worth of credit in the entire 1946-1954 period.

Here is a breakdown of the fairly firm commitments:

Egypt: $165-million. Of this, $140-million is for Czech arms, $15-million for bridges, power machinery, a ceramics factory, plus other light industrial equipment from East Germany, Poland, Hungary, and Czechoslovakia. Repayment is to cover 30 years, in cotton and rice, at 2% interest. (Note, too, that the Russians tentatively offered to help finance the High Dam at Aswan.)

Afghanistan: $115-million. Of this, $100-million is a long term trade credit to permit import of Communist power, irrigation, light industrial machinery. The remaining $15-million is for road building, grain storage—and arms.

India: $150-million. About $100-million is to partly cover financing of a 1-million ton steel mill, repayable in rupees over 12 years at 2½%. Another $45-million will finance import of Soviet steel. The rest is for oil drilling and mining machinery, a Czech bridge.

Indonesia: $20-million. Some $13-million is for an East German sugar mill; $5-million for a Rumanian cement plant; $2-million for Czech machinery.

Burma: $5-million. Trucks, autos, construction equipment—plus a barter deal involving 20,000 tons of Burmese rice yearly in exchange for capital goods.

Iran: $3-million. A sugar mill.

Syria: $8-million. Czech sugar mill, East German cement plant. In addition, there's talk of a large Communist-financed oil refinery.

Turkey: $4-million. For Czech, East German, and Hungarian spinning machines and other light equipment.

Lebanon: $2-million. No details—the deals are still unconfirmed.

Yugoslavia: $83-million. Credits, plus cancellation of old debts.

In addition to these fairly firm commitments, the Soviets are dickering with Pakistan, Saudi Arabia, Yemen, Liberia, and Libya. There are barter deals in Latin America.

These offers of economic assistance are not the full measure of the new Communist trade drive. The growing imbalance of the Russian economy, between industry and agriculture, permits Moscow to offer other nations a new market for farm surpluses and other raw materials. Beyond that, the Russians have this propaganda advantage: They can point to their own success in developing a backward economy. That the Soviet performance in building heavy industry has impressed India is apparent in current Indian thinking about the Five Year Plan (page 11). ◄

In Latin America . . .

1. Suppliers to $500-million yearly chemical import market are competing more vigorously.

2. Composition of imports changes as bulk buying, local packaging, manufacturing, increase.

3. These are signs that the 20 Republics are fast becoming a . . .

Chemical Frontier in the Americas

Chemicals, reports the Chase Manhattan Bank's *Latin American Business Highlights*, are one of the fastest-growing industries in Latin America. For example, look at these developments coming in the field of petrochemicals alone:

Brazilian production may begin in August, with facilities for some 130,000 tons yearly output. A new **Mexican** plant—180,000 tons—is scheduled to start up this year. **Colombia's** proposed operation would produce 100,000 tons of various petrochemical products; **Venezuela** plans an even larger installation; and **Peru** is studying blueprints for a plant of its own.

The opportunities for making chemicals in Latin America, and for providing equipment and skills that an expanding chemical industry require, are growing with Latin American industrialization.

Indeed, chemical opportunities are expanding faster. The use of chemicals rises more rapidly than general industrial output. In Latin America, industrial production has doubled since 1939. So consumption of chemicals may now be three times prewar levels.

The charts above hint at some of the changes taking place in Latin American chemical markets. Imports supply about two-thirds of all chemicals, a $500-million-a-year market which would be larger were it not for exchange difficulties in several nations. Yet the composition of chemical imports is changing—as the second chart shows. Heavy chemicals show a smaller part of the total, because more are being manufactured locally in Latin America. The same is true of medicines and drugs; also more drugs are being imported in bulk and packaged, which means lower import costs.

The first chart shows the changing position of chemical suppliers, as Western Europe increases its share of the market at the expense of the U. S. A. Moreover, the Europeans are putting more money into Latin American production, frequently in association with local capital. At the same time, American capital in Latin American chemical manufacture amounts to over a quarter-billion dollars, and is growing each year.

The area's output of chemical products for consumers has shown the most rapid development. A bigger proportion of drugs, dyes, synthetic fibers, and other consumer goods is made locally. You see the beginnings in several nations of the manufacture of basic

plastic materials, to supply the fast-developing plastic fabrication industry which depends largely on imported raw materials.

Production of heavy chemicals is well under way in Argentina, Brazil, Mexico, Chile. Sulfuric acid output is almost large enough to meet all Latin American needs. But production of alkali and soda ash lags way behind demand. When Brazil's 100,000-ton soda ash plant at Cabo Frio opens (scheduled for 1958), Latin American output will increase six fold.

Heavy chemicals growth is troubled by the limited size of local markets, which restricts production to small-scale factories with high unit costs. Further, industrial chemicals require a relatively heavy capital investment per unit—and capital is scarce.

Among all the chemicals, fertilizers are perhaps most important for the 20 Republics. Agricultural output per capita still lags behind prewar levels; save for Chile, no country makes enough fertilizer. ◄

Japan Speeds Tool Building

To compete in world markets, industrial Japan needs more efficient machine tools. The plan: replace imports with made-in-Japan.

Digested from AMERICAN MACHINIST, Feb 27, p177

As a competitor in international markets, an industrial nation can be no stronger than its metalworking industry. And metalworking depends on machine tools. No nation is more aware of that than Japan, striving hard to build up its own machine tool industry.

Japan is contending for Eastern Hemisphere markets for all kinds of machinery and equipment. It hopes to make further inroads into dollar and sterling markets, with hard goods like sewing machines, cameras, hand tools. The Japanese aircraft industry is beginning again. All these demands —plus modernization of home industry—are creating a vast Japanese market for machine tools.

The war-battered Japanese tool builders have made a remarkable comeback. Yet they are struggling to supply their own market. Last year, they managed to provide 45% of the nation's needs. The rest was supplied to Japan by its own competitors in world markets, who are finding profitable business selling machine tools to Japan.

Americans have been supplying roughly half Japan's tool imports. Germans, followed by Swiss, French, British and Swedish companies are competing vigorously for a bigger share. A number of foreign companies are providing technical help to Japanese firms, developing new and more efficient machine tools. French technical ideas, apparently, are eagerly sought by Japanese.

Technical help is just what Japan wants—the nation is determined to become more self sufficient in machine tools. By 1958, Japan hopes to supply 60% of its tool needs. By 1965, it hopes to reduce imports to just 25%.

To that end, the government has raised certain tariff barriers against tool imports. And it has begun "three-year plans" to build up the industry. The first (to be completed this year) consists of government loans to promote new machine development. Some $700,000 has been spent; one tool to come out of the plan is reported to be a radically new system of gear cutting.

Japanese tool building companies—fiercely competitive, under-capitalized, often in shaky condition—are nonetheless optimistic. They believe that tool production will have to grow at a rate of 5% to 10% yearly to meet the needs of an expanding economy. They expect many made-in-Japan tools to replace imports. On the other hand, they admit that Japan will need large numbers of the more complex, costly machine tools from foreign suppliers. ◄

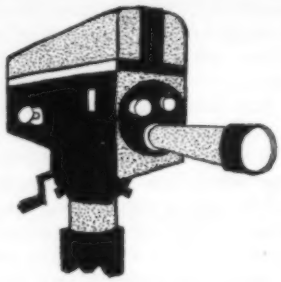
VW's Nordhoff: "Genius—and Dictator"

Generaldirektor Prof. Dr. Ing. h.c. Heinz Nordhoff (right), head of Volkswagenwerk, has a job many management men envy. At a moment when the U.S. auto industry has been lagging—and the British industry has been curtailing output sharply—the main plant of Volkswagen at Wolfsburg, West Germany, is running full tilt. Yet demand outpaces output, and plant expansion is rushed. The company is making 1,400 cars a day now, shooting for 1,500 daily within a year.

Nordhoff's competitors classify him as a "production genius." But the blue-eyed, 57-year-old automaker devotes much of his boundless energy to personal supersalesmanship around the world.

Nordhoff seems to share the philosophy of the elder Henry Ford, who had the idea that many consumers want sheer transportation, a car not very stylish, perhaps, but reliable and cheap. Volkswagen executives insist that no basic model changes are on the drawing boards.

Nordhoff's most unique advantage is that "he can run his business more or less as a dictator," according to a rival automotive executive. The Nordhoff "dictatorship" derives from VW's lack of owners. Built by Hitler, it is under government trusteeship. The government has no interest in running the plant; Dr. Nordhoff is given a free hand. He uses it.—Digested from THE WALL STREET JOURNAL, Mar 20



- Television has become one of the most powerful social and economic forces in America.
- It sells goods on a dramatic scale. Despite high costs, advertisers are waiting in line.
- The next ten years may see TV bigger than all other selling mediums combined.

TV Sells Goods Like Magic

Digested from BUSINESS WEEK, Mar 10, p76

The infant of 1946 has grown into a towering, all-powerful Cyclops. In ten years, television has changed just about every American's way of life.

TV has been blamed for eyestrain, stomach troubles, illiteracy, juvenile delinquency, marital problems—even the common cold. It has been praised as the solace of the ill, the infirm, and the lonely, and upheld as the greatest educational tool in the world.

As a seller of consumer merchandise, its record is amazing the marketing experts. And there is no end in sight.

Television in America dropped into the middle of a new social revolution: the mass movement from crowded city to less crowded suburb, new realms of leisure, rising incomes, and a tremendous demand for goods and entertainment that had been restrained during years of war and financial depression.

By now, close to 40-million American children have been born into a world of television. Last year, in homes with TV sets—three-quarters of all families in the country—more total time was spent watching TV than in any other single activity except sleep. That includes the business of making a living. Market research shows:

- People in the U.S.A. spend 2.6-billion man-hours per week watching TV, and 1.9-billion hours in all economic pursuits. Most people who watch TV are in front of the screen almost 16 hours a week. With four in the average family, that puts family TV time over 60 hours a week—against 56 hours per family spent in working.
- Over 33-million homes have TV. New sets are selling at a rate of 8-million a year. The number of families with television has doubled in three years. The industry expects an increase to 55-million TV families in the next ten years.
- The longer a family has a TV set, the more it is used. Each individual watcher last year averaged 1½ hours more per week than in 1954.
- There is more and more program "selectivity", and a growing demand for better programs. Yet 19 out of every 20 TV sets are on more than four hours every weekday evening.
- In 1955, the public paid $3.3-billion for home TV—almost $2-billion for new sets, the balance for parts and service. That is not far below the estimated $4-billion that Americans spent for newspapers, magazines, moving pictures, stage productions, and all spectator sports combined. Advertisers spend about $1-billion sponsoring TV programs.

Modern television in the U.S.A. dates back to 1949, when commercial sponsorship started in measurable volume. That year, 3-million TV sets were sold, as against 8-million now.

In the past three years, the number of TV stations has jumped from 108 to 441—beaming programs to a potential 95% of the population. Programs are pretty tightly controlled by three major television "networks" with headquarters in New York—Columbia Broadcasting System, National Broadcasting Co., and American Broadcasting Co.

Of the 441 TV stations on the air Jan 1, only 14 were owned by the three networks, but 407 had contracts to show network programs at least several hours each day. Major networks produce and coordinate programs shown over the individually owned stations. The TV networks buy telecast time from local stations, produce programs to fit that time, and then sell the composite time to commercial sponsors—profiting on the difference in price.

Program material is of rather doubtful quality in many cases, despite the present trend toward improvement. In a recent speech, the chairman of the U.S. Federal Communications Commission—which supervises radio and TV licensing, prevents advertising abuses, etc.—said that "some programs are more appropriate for the bar-room . . . than for the living room." He hinted that TV must improve its output or suffer more extensive government regulation.

Television executives are responding to both government pressure and public demand for higher type TV material. But this is no easy task, considering that a

"From the businessman's viewpoint, TV is an electronic blessing. It gets merchandise from store shelves to customers."

major station must program about 5,000 hours a year—some produced locally, some by the national networks.

Just to fill up its time, TV already absorbs over 50% of the film output of the movie industry, and has financed scores of films. For program ideas, the story department of one network goes through each year over 15,000 books, plays, magazine stories, and scripts.

To improve quality the networks are infiltrating further and further into the "legitimate" arts. The networks are even financing new plays for the stage, searching for productions that can later be exploited for TV showing. Network executives have started at least one grand opera company to tour on the stage and, of course, make TV appearances. High-quality films—like Laurence Olivier's British-made version of Shakespeare's Richard III—have been imported from abroad for special TV showing, three hours at one sitting.

Network officials hint of buying publishing companies, to control more potential TV material. And one ambitious soul has even talked about having the networks buy up all professional baseball and football teams, for better TV scheduling of games.

TV Is a Merchant. From the businessman's viewpoint, TV is an electronic blessing. It gets huge volumes of merchandise off store shelves and into the hands of customers.

Some marketing men make extravagant claims. One executive —who gives TV much of the credit for the current business boom— argues that after the Korean War ended, the selling power of the medium stopped an incipient business recession. He believes television persuaded people to buy goods when they would normally be cutting down purchases.

Sylvester Weaver, head of National Broadcasting Co., goes a step further. Never one to indulge in understatement, Weaver sees television as the driving force behind a never-ending prosperity. TV, says Weaver, will make people want to buy products to the extent that they will actually work harder to make more money—to spend.

Advertisers have become so impressed that television has passed every other single medium for national advertising. Last year it accounted for 15% of all advertising expenditure—including direct mail, business publications, outdoor advertising, premium offers, display ads, as well as magazines, newspapers, and radio.

Radio, incidentally, has not died —as many people predicted a few years ago. Radio is still heard by about 92% of the population part of every day. But in the average home, the radio is turned on only about one-third as long as TV.

Many national advertisers have been leaving radio. Local sponsorship (town, city, state) accounts for over half of radio's total revenue—$565-million in 1954. Local advertisers pay only one-fifth of TV's total revenue.

Television's biggest advertiser for the first six months of 1955—the latest tally—was Procter & Gamble Co., soap manufacturer. (In 1954, P&G paid close to $24-million for TV network programs.) Colgate-Palmolive Co., another maker of soaps, was in second place; Chrysler, auto maker, was third; Reynolds Tobacco Co., fourth.

Sponsorship is a problem. Today 75% of TV advertisers are participating in multiple sponsorship of single programs. Thus costs —per advertiser—are lowered and more companies can secure time. But it is a question how many of the 2,600 companies listed by the networks as users of "national" advertising on TV can actually get very much time. As it is, the top 10 advertisers in 1954 accounted for about 36% of TV expenditures.

Revenue gains of TV have been sensational. In 1955, advertising expenditures for all media jumped about 10%; TV revenues rose 20%. Its proportional share will probably get even bigger. Charges for both time and talent will rise about 25% during the next three years for black-and-white telecasting. Color TV may add another 10% to 15% to the total charge.

But television executives are not at all afraid that higher rates will cause advertisers to drop out. For six years, many advertisers have been complaining loudly about being overcharged for TV time. Yet they are waiting in line to spend their advertising dollars.

Success stories among TV advertisers are commonplace. For example, since "The $64,000 Question" started—a program on which big money prizes are given away to successful quiz contestants—the sponsor, Revlon (cosmetics), has been struggling to bring production near demand.

Dow Chemical Co.'s transparent home food wrapping, Saran Wrap, went from 120,000 rolls a month to 3.8-million monthly after one year on TV.

". . . sales of TV-advertised products jumped 33%."

The impact of TV on sales is difficult to measure exactly in many cases. Big advertisers usually use many other media at the same time. But there are some indications:

- A. C. Nielsen Co., leading market research concern, checked a single specialty food during an ad campaign in three local areas: one with no TV, one with a single station, one with several stations. Sales stayed even in the non-TV area, went up 22% in the multi-station area, and went up 29% in the one-station area. (In the one-station area, probability of the ads being seen is higher.)
- A recent check in Fort Wayne, Indiana, was made for National Broadcasting Co. by W. R. Simmons & Associates Research, Inc. Research teams went through the town before and after a local TV station was installed. Conclusion: Among TV set owners, sales of TV-advertised products jumped about 33%. Some brand preferences changed sharply.

Retailers in the town became more aware of TV than any other form of advertising. They began to stock more of the brands advertised on the station, and give them better display space on counters.

"Discount houses" have been greatly helped by TV in the U. S. A. The discount house is a low-price, high-volume retailer who sells goods—usually appliances and other hard goods— in competition with the more conventional retail stores.

TV helps the discount house because of "pre-selling" by demonstration that is so popular on television screens. Since they know what the product looks like, and how it works, the customer is willing to buy the product with out even asking to see it.

The future of American television in the next ten years looks like an advertising man's dream come true. Note what is starting to happen:

- Color TV is coming fast—200,000 sets this year, 500,000 to 1-million in 1957, more than 5-million by 1958, after that, all color. By next fall there will be 100 hours of color TV on the networks a month. A leading cigarette maker has already redesigned its package with color TV in mind. Marketing men suggest that color TV is "hypnotic" (*see MD, January*).
- Educational TV is spreading into schools and factories. Closed-circuit programs are proving to be an excellent training device in industry (*see MD, February*).
- Pay TV—charging viewers at home for special programs by coin box—is a possibility. Some 70% of TV advertisers are in favor of trying the idea.
- Tape TV—recording of all programs electronically on tape—may alter network operations and aid color television.
- Wall TV—big screens at home, maybe 5 feet by 7 feet—is in the testing stage. It may, within a few years, bring life-size performances into the home.

"With color, tape, and mural TV," worries one television man, "everything they say about us may come true. Leisure time and television—or at least the screen—will become synonymous. You'll never be able to turn the thing off." ◀

▶ YOU AND YOUR PERSONAL AFFAIRS

"What kind of person would you like your boss to be?" The question was put to 20,000 office employees recently, in a survey conducted by the National Office Management Association, Detroit, Michigan.

Perfection of character and personality is neither demanded, expected, hoped for—nor even suggested—by the average office employee. The "ideal" boss in the office, according to survey results, fits this description: (1) He is between 40 and 49 years, is skilled at his job and has "common sense." (2) He may show impatience and bad temper at times, but he is never unjust with his employees. (3) He may be given to some laziness and unpunctuality; these are not critical so long as they do not place an added burden on the workforce. (4) He can be stubborn, too—in fact, he is expected to be stubborn. But he cannot appear to "know everything" and expect to get good cooperation.

✦ ✦ ✦

The critical health age for executives is between 30 and 40 years—not the later decades, as you might expect.

So reports the Life Extension Examiners, a medical organization that handles physical examinations for over 15,000 American management men each year.

The decade of the 30's is the period of beginning ailments —indigestion (leading to ulcers), fatigue, chest pains, even early heart disease. **Tension on the job, say the Examiners, is the major cause of trouble.**

Only one-third of the symptoms found in the 31- to 40-year-old executive group can be traced to an organic cause, and treated directly. The rest are "functional"—caused by the manner in which the men live and the state of mind in which they work. **The 46- to 50-year-old group actually has fewer ailments than the younger men directly behind them.** This may be because the older group advanced to their executive jobs during a "slower" period— at a less competitive and hectic pace, with less tension.

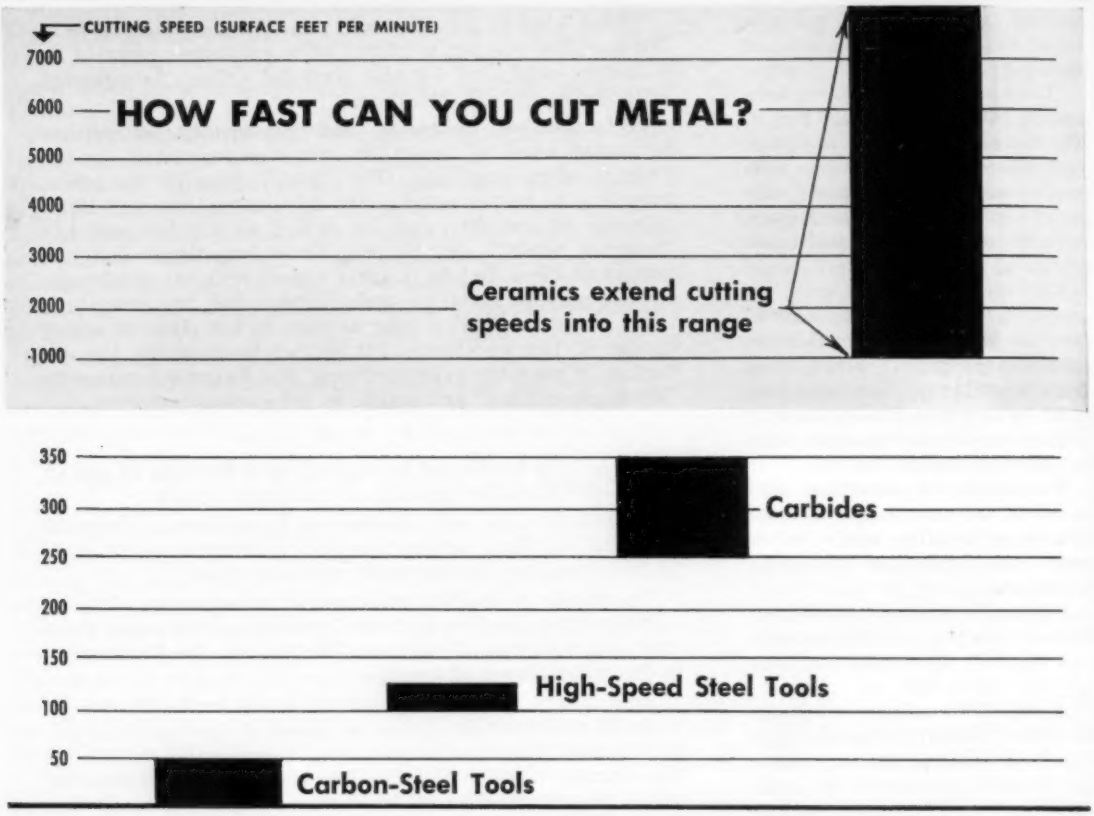
The younger executives are afraid to slow down. They take work home every night—if not in a briefcase, then at least in their minds. They fear being surpassed by others their own age. They work even harder if top management suggests that they slow their pace a bit.

Yearly physical examinations aren't the complete answer. They are only a form of physical maintenance; they fail to get to the true causes of tension and anxiety. What is needed is a real effort by management to create in the office an atmosphere of security, social ease, relaxation. **One hopeful sign:** management's growing interest in psychiatry.

✦ ✦ ✦

Retirement planning poses a challenge to management. Recent studies among 1,500 retired persons (over age 65) show that "retirement counseling" in industry is superficial, shallow, boring to those who receive it. About 50% of executives questioned said that their companies had failed completely to help them prepare for retirement. **Industry loses** because supervisors and executives, unprepared and dreading retirement, lose much efficiency during their last two or three years on the job.

YOU has been compiled from American Business, Business Week, Factory Management & Maintenance, and other sources.



Ceramics: Now They Cut Steel

Digested from AMERICAN MACHINIST, Mar 12, p153

Every so often a development comes along that fires the imagination of an industry. Just such a thing has happened in metal cutting. Ceramic tool bits are causing a great deal of international excitement. They can:

- Cut metal two to four times as fast as the best tool materials in use today.
- Cut heat-treated parts too hard for carbides.
- Last up to 25 times as long as carbides.
- Produce better finishes.
- Operate without a coolant.

These are the plus factors. On the other side of the picture, some problems still have to be overcome. Tool breakage is high especially at the beginning of cuts where the impact of the brittle ceramic against metal is high. Interrupted cutting—as in the faces of irregular pieces—is giving trouble. The Czechs, however, report success in turning cast-iron diesel pistons pierced with holes for wrist pins (see box). And right now cost appears to be two or three times that of premium carbides.

Ceramic's major ingredient is aluminum oxide. Unlike the high-speed tool steels and carbide cutting tools, the ceramics require none of the critically scarce materials such as tungsten, tantalum, cobalt, nickel. Other ingredients, not yet identified, may include silicon oxide, magnesium oxide, and binder materials. The mix is pressed to shape and then fired much like ceramic tile.

Like tile, the ceramic toolbits have high abrasion and erosion resistance, and high compressive strength. But they are brittle. Most development work on ceramic tools is devoted to producing better binding materials. The brittleness characteristic depends, to a large extent, on the binder. Thus the best binder would preserve the hardness and compressive strength of the tool, but give a tougher material.

Bending strength is considerably lower than that of the carbides, but hardness and high-temperature strength are considerably higher. Heat conductivity is low—lower than that of carbides. So unequal heating causes cracking and shattering. This means trouble in applying a cutting fluid and resulting alternate heating and quenching from chip interference with the coolant stream.

It also means trouble in trying to braze the tip by normal methods, although glass "solders" or fired-on metals have been used in Europe. Epoxy resins may eventually work because of the low thermal conductivity of the ceramic.

The tendency to break means the holder must be designed to minimize mechanical stresses (such as bending) and to avoid stress concentrations by providing large areas of perfect contact surfaces. One way to do this is to support the bit on high-rigidity tungsten-carbide and to clamp the bit with a band, strap, or rigid bar. A companion problem is to design the holder so it is not damaged when the cutting tip cracks.

Strangely, ceramics have inferior low-temperature strength coupled with good high-temperature strength. This permits running dry, and on most present tests this has been done. Here is a bit that operates better than carbides at higher temperatures. Now if a machine can be made to stand the heat, all cutting can theoretically be done at optimum temperatures. Cutting fluids are not necessary for the bit; they are needed primarily to protect the work.

Another characteristic of ceramics is that they are heat insulators, so they do not absorb heat as metals do. This leads to the "peculiarity" noted by observers—that the tip remains "cool" to the touch even after a heavy cut. Also, the chip does not "weld" to the tip because the latter is a non-metal and because surface speeds are usually too high.

There have been experiments with ceramic tools for 15 years or more—most of them not very successful. English experiments during World War II were continued after the war. Out of these experiments came ceramics that worked well with abrasive plastics. At least two years ago, a British company (BSA Tools Ltd.) announced ceramic toolbits, but eventually abandoned them. Tests brought out this verdict: "No good for steel—yet."

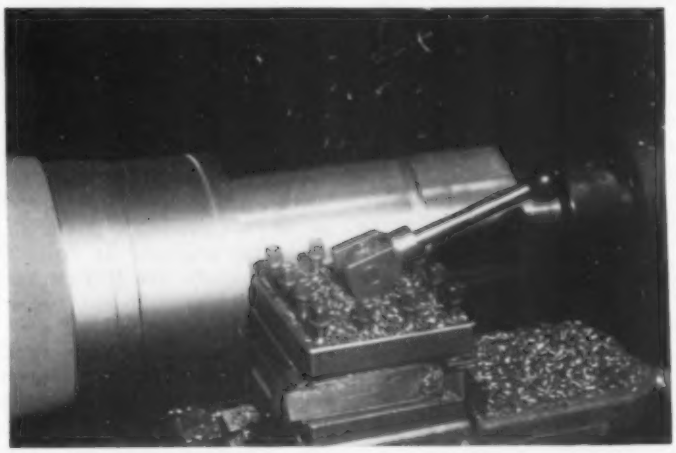
But Russia seems to have gotten the jump on the rest of the world. Indications are that Russia has had at least seven different ceramic bits in use since 1954. And intensive development has been underway since 1947. Ceramics are mentioned increasingly in reports from Czechoslovakia; in fact, the Czechs are exporting ceramic tools to French industry.

At least six American companies have been busy developing ceramic tools. Four have announced availability of commercial bits: Norton Co., Carboloy Dept. of General Electric Co., Stupakoff Div. of Carborundum Co., and Diamonite Div. of U.S. Ceramic Tile Co.

These four manufacturers are putting ceramic tools on the market as a step toward solving some of the toughest problems in metal cutting. The industry looks at them not so much as replacements for other tool materials, but as additions to the array of cutting materials.

Most of the research and development has been done with lathes because of the nature of the material. (Best advantage can be had with ceramics at high speeds, big cuts and low-shock applications). Only a few experiments have been made with other machine tools. The outlook is for lathe cutting tools to form the lion's share of the market for ceramics.

Guesses about the future of ceramic tools cover a wide range, depending on whom you talk to. A carbide maker in Europe says carbide suppliers will have "ceramics in their left-handed pocket ready for the occasional job that carbides cannot handle." Other



Czechs Make Interrupted Cuts

One of the drawbacks of ceramic toolbits, as they are today, is the fact that they don't seem to stand up under interrupted-cutting conditions. But reports from the Skoda engine plant in Prague, Czechoslovakia, indicate that under the right conditions, ceramics will work to advantage. Skoda turns out cast-iron pistons with wrist-pin holes already bored. This is one of the toughest interrupted cuts.

Key to success with the ceramics seems to be the toolholder. It avoids excessive clamping stresses on the ceramic bit and allows shifting to use four different cutting edges. The tool tip is tilted by the holder to give a 5° negative top rake. Both the support block and clamping plate are detachable, and are positively located on the body.

Comparison with carbides on identical set-ups show little savings in cutting time. But savings in tool resharpening time and material were greater with ceramics. Finishes were better, too. The Czechs feel that the saving of costly tungsten carbide is the outstanding advantage of using ceramic toolbits.

experts see extensive use—and quickly—because of current problems in automation. For example, time lost during tool replacement is a major cost factor on an automated production line. Ceramics may cut this down-time.

The development of cement carbides may provide a clue as to how fast industry will adopt the ceramics. Carbides were first introduced about 1928, but it was not until World War II forced tremendous emergency production of hard-to-work materials that carbides really caught on. Machine tools of 1939 design were powerful and rigid enough to use them economically; those of 1947 used them much more efficiently.

The ceramics may create the same problem all over again, because they demand maximum rigidity and can use high power from the machine tool. Also, the ceramics are still very new—there's much development ahead.

Lastly, there is the matter of user inertia. Many metalworking people resist change, particularly one where the new material is harder to use and easier to ruin than the old. They stick to the tried-and-true as long as possible, in an effort to restrict problems to a limited and familiar area. But big mass producers and the progressive smaller producers will use ceramics promptly and effectively in combination with carbides just as they now use carbides with high-speed steel. The ultimate effect will be to force metalworking people to use carbides more effectively, just as the introduction of carbides forced high-speed steel users into better use of high-speed steel.

Long-term, the implications for metalworking management seem clear. The coming of ceramic tools implies another stride in machine design. Only heavier, more powerful and more rigid equipment than is generally available today can take full advantage of the ceramic tool bits. Also, the high speeds possible make manual control impractical. So future machines will probably be more complex, more costly. Still, this does not present too great a problem—automation is making management think in terms of a bigger investment per machine tool. ◄

Looking Ahead in Production

A gadget that "stops" chemical reactions . . . reinforced plastic brushed on . . . nylon from castor oil . . . synthetic fibers with metal coatings . . . Mexico's attempt to harness a steam geyser. These are developments to watch.

A new chemical reactor has been developed at the California Institute of Technology. Called a "ballistics piston," it has produced temperatures up to 10,000°F. and pressures up to 100,000 pounds per square inch in research on gas-phase reaction kinetics.

Heart of the device is a stellite-faced piston confined in a long thin carbon-steel tube. Gaseous reactants are introduced into the space below the piston—the reaction chamber. Compressed air goes into the space above the piston, which is released by shearing a retaining pin.

High temperatures and pressures are attained under compression in about 0.0005 second. In another 0.0005 second, the piston rebounds, pressure is off, and the gas returns to room temperature. Result: The reaction, which is only partly completed, is "frozen" at its peak. Thus, at this critical stage, the products can be recovered for study. It's still too early to tell what products can be made this way.

While the new reactor is strictly a laboratory tool, it could prove to be a highly important one. Researchers expect to gain information useful in building future chemical plants. And French chemists have tried reciprocating engines (not free pistons) for making organics.—Digested from CHEMICAL WEEK, Mar 10, p59

A new Brazilian plant to make nylon fiber from castor oil is being built at Sao Paulo. Backing the venture are Brazilian interests and Organico, a partially-owned subsidiary of France's Pechiney. Monomer, polymer, and fiber will all be made by Pechiney's Rilson process. Since Brazil is one of the world's top producers of castor beans, making nylon by this route could be especially attractive.

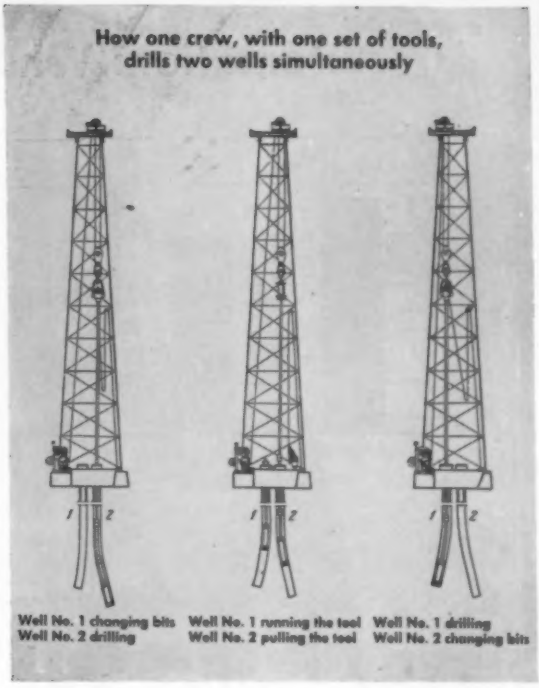
Reports of another new fiber based on castor oil come from Japan. A newly-made synthetic—based on castor oil, coal, and petroleum—is said to be lighter than nylon, easier to dye, and more resistant to heat.—Digested from CHEMICAL ENGINEERING, Mar, p103

Brush applied, fiber-reinforced, plastic is giving metal surfaces an effective, economical protection against sea water, chemical agents, other corrosives. Produced by V. G. Ltd. (London) the material consists of a mixture of a synthetic resin with high alumina cement, reinforced with a tough woven fabric. The compound is impermeable but flexible, shows no softening at high temperatures, and has good impact strength.—Digested from PRODUCT ENGINEERING, Mar, p7

Vaporizing metal on synthetic fibers has been done by the Textile-Chemical Research Institute (Badenweiler, Germany). The process consists of electrolytically evaporating metal in a high vacuum, then permitting the metal vapors to condense on the fibers. To date, the process has been carried out with gold, silver, chromium, aluminum, and iridescent interference colors. Work is being done to develop the process so that the fibers will be washable, non-fading, and resistant to pressing and rubbing. Research is also being done on metallized perlon to make it electrically conductive. — Digested from PRODUCT ENGINEERING, Mar, p5

Mexico expects to get usable power from a subterranean steam jet near Mexico City, perhaps as much as 25,000 kilowatts of energy. The process is much the same as the one developed in Italy. The main problem: How constant will the steam jet be after the power plant has been in operation over a period of time?—Digested from ELECTRICAL WORLD, Feb 20, p100

FRENCH CLAIM faster, cheaper oil-well drilling for turbodrill and no loss of energy turning drill string.


How one crew, with one set of tools, drills two wells simultaneously
Well No. 1 changing bits
Well No. 2 drilling
Well No. 1 running the tool
Well No. 2 pulling the tool
Well No. 1 drilling
Well No. 2 changing bits

RUSSIANS DRILL two wells at a time with turbodrill. This feature, they claim, can save on labor costs.

Turbo Challenges Rotary

Digested from PETROLEUM WEEK, Mar 9, pp10, 16; Mar 16, p16

In the race for cheaper ways to drill for oil, Russia and France both may have come up with a practical turbodrill. Instead of turning the whole mass of pipe above the drill bit, the turbodrill turns only the bit at the bottom of the hole. A small turbine attached to the drill bit and driven by mud pumped through a pipe provides power. Lighter and cheaper drill pipe can be used. Penetration rates for both units is said to be 8 to 10 times greater than the conventional rotary drill, in certain formations.

Note this added significance of the Russian turbodrill: An American supplier of oil-well equipment, Dresser Industries, Inc., secured 10-year rights to manufacture the drill from the Russians. If the arrangement is acceptable in Washington, it would be one of Communist Russia's first contributions to modern American technology.

In France, Etablissements Neyrpic says its turbodrill is similar to the Russian version. Basic reason for the success of the drill, says a Neyrpic engineer, is that no energy is lost "while only 6% of the energy required is transmitted to the rotary drill at 6,000 feet." In one recent trial, the new device drilled 24.6 feet of hard rock in one hour. A conventional drill could have made only 2.6 feet per hour in this formation, says Neyrpic.

FRENCH TURBODRILL is pulled out of the hole so that it can be checked for wear.

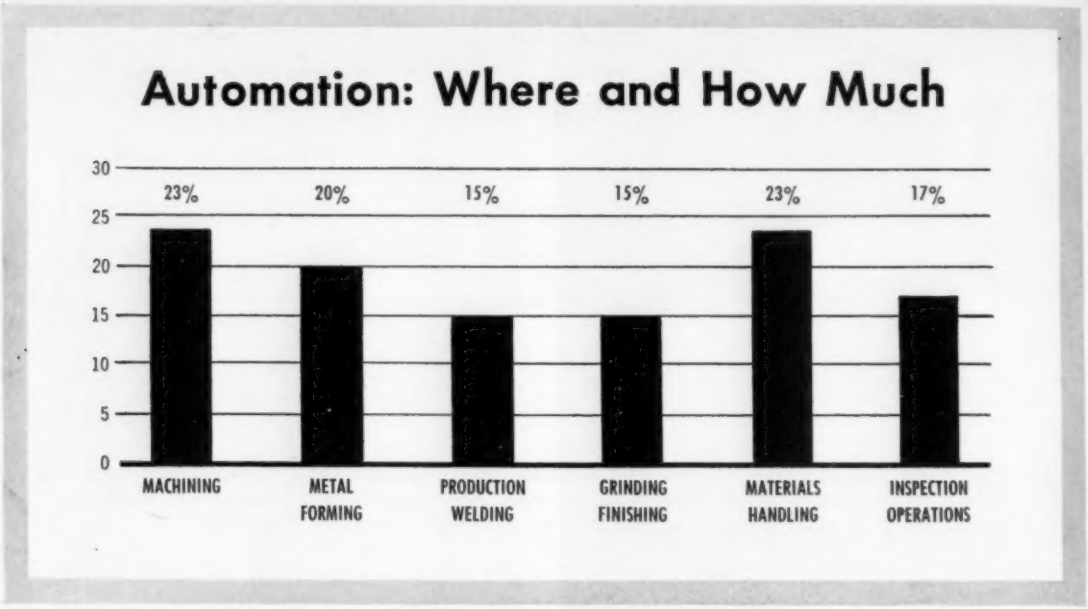


Chart shows how much (percentages) different processes can be automated.

Survey Points Out Automation Trends

Digested from FACTORY MANAGEMENT & MAINTENANCE, Mar, p124

Get two metalworking executives together and sooner or later the talk drifts to what's ahead in automation. And one will ask "How much of my business can be automated?"

The American Society of Tool Engineers has some educated guesses that at least point the way toward an answer. They are based on a study covering major metalworking industries in the U. S. A. While the figures apply specifically to the U. S. A., the thinking behind them can be applied to metalworking everywhere. Here are some of the survey's findings.

1. As far as industry can see today, automation can be applied eventually to about 16% of all manufacturing operations in the metalworking industries.

2. The percentage, while small, would open enormous potential markets for all kinds of equipment, because a majority of conversions to automation would require complete replacing of present processes and equipment.

3. Automation is less adaptable to the really big plants than to the medium-sized plants. It is easier to automate the manufacture of an engine, a transmission, or an axle, than it is to automate production of a complete automobile. (*Factory*'s editors feel that "is not being so widely adopted," would be more accurate than "automation is less adaptable.")

4. If automation should take hold on a broader scale, the "big plant" concept as being the most efficient would be discarded. This means that the medium-sized plant would take precedence. (*Factory's* comment: The trend to medium-sized plants was in full swing before automation became a major factor. Automation might be an accelerating factor, or it might simply be that management of the medium-sized plant is closer to its operating problems, and therefore sees the opportunities.)

5. Automation is entirely feasible in many small plants in which production is relatively continuous on one or two products. (*Factory's* comment: Automation can be applied under other circumstances if the small company has both imagination and capital).

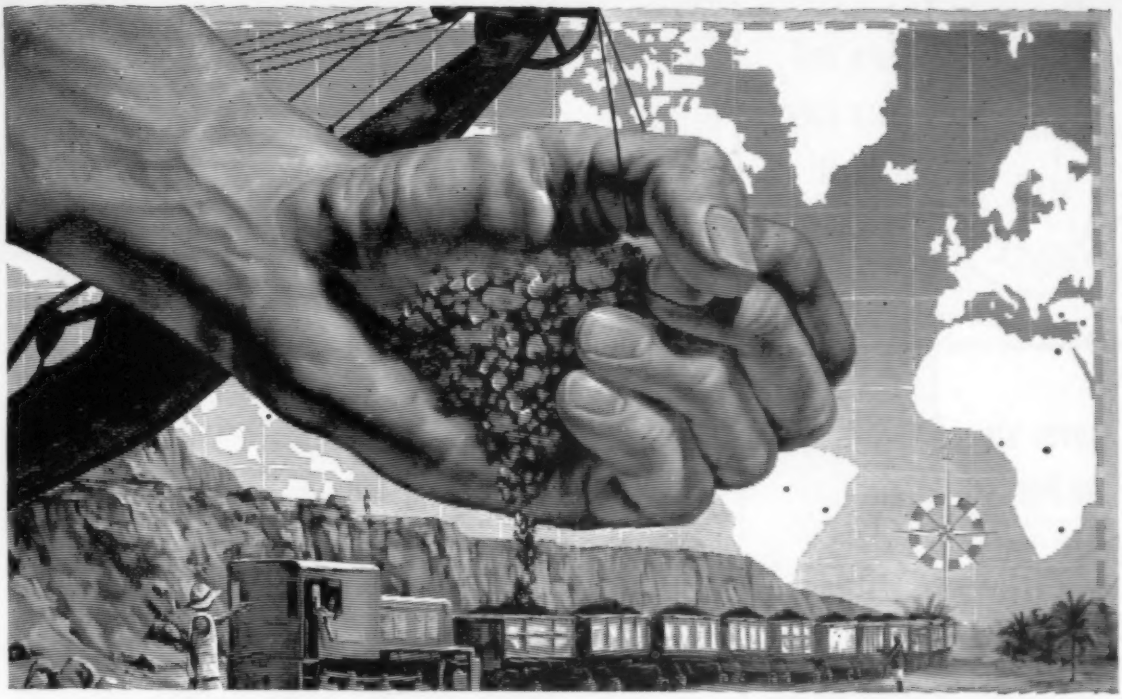
6. Automation is of top interest to producers of "fabricated metal products" in general (pots and pans, toys, pipe fittings, sporting goods, etc.)

Companies that have a small estimated potential of automatable operations give many reasons for "not automating" in their reports to the ASTE. The reasons, generally, add up to this: "insufficient number of sufficiently identical repetitive operations."

The biggest single factor that could speed adoption of automation appears to be development of standardized units. Management looks for units that would not have to be scrapped every time there is a model change, but could be reused with only minor modifications.

Added to this might be "greater versatility in the control and operating equipment to handle wider ranges of sizes or more complex operations than is now possible." Also the survey points up the need for automation equipment adaptable for short runs.

While the ASTE study had not intended to do so, it did reveal that a more extensive use of automation would have far-reaching effects on product design. Returns indicated that automation would bring with it greater standardization of components in the company's own products. ◀



The metal that thrives on punishment

Steel serves you better when manganese is added —because the harder it works, the tougher it gets

EVER WATCH a power shovel bite into earth and rock? And wonder how the teeth of the steel bucket can endure such punishment? The amazing answer is that the teeth not only endure such treatment—they actually get harder because of it!

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ADDED TO STEEL—All steel contains manganese. A small amount "cleanses" molten steel and removes impurities. A larger amount of manganese makes the steel tougher and stronger.

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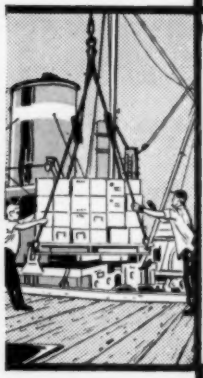

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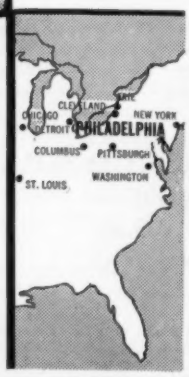

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Plastic Poles Stop the Woodpeckers

Fiber glass utility poles for power and telephone lines may prove a revolutionary development in the electric distribution field, now almost exclusively confined to wood poles. These experimental fiber-glass poles were produced by Gar Wood Industries for Consumers Power Co. (Michigan).

Poles are impervious to attacks by rot, moisture, woodpeckers, and termites. Two men can lift them, instead of the six needed for ordinary poles. They are hollow tubes; and their strength equals that of low-carbon steel. —Digested from ELECTRICAL WORLD, Mar 5, p79

Europe Likes Its Food in Metal Tubes

European housewives have taken to buying foods packaged in collapsible metal "toothpaste" tubes. There are special reasons for this type of packaging—reasons that make sense for other places in the world. Limited home refrigeration contracts the market for fresh and frozen foods. Shoppers are apt to buy food in small quantities—for the day, or even for the next meal. The tube, with its small quantity and tight closing, has obvious advantages.

A typical housewife's shopping list might include tubes of liver spread, smoked ham, salmon spread, herring, eels, chocolate syrup.—Digested from FOOD ENGINEERING, Mar, p61

from the mines . . .

to every form of manufacture

View shows the MS "CITY OF QUITO", one of the many sea-going vessels dependably powered by NORDBERG DIESEL ENGINES.

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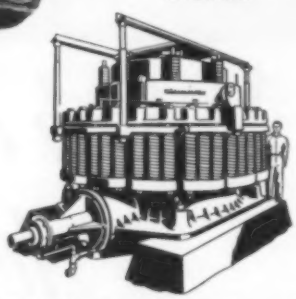

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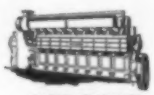

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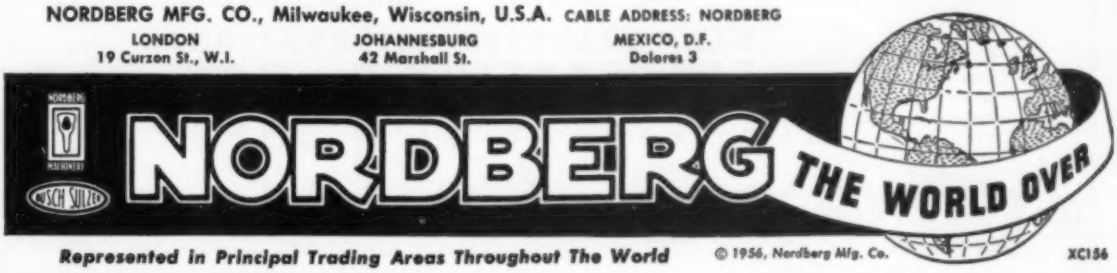

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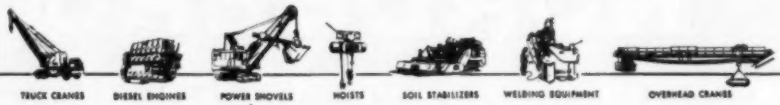

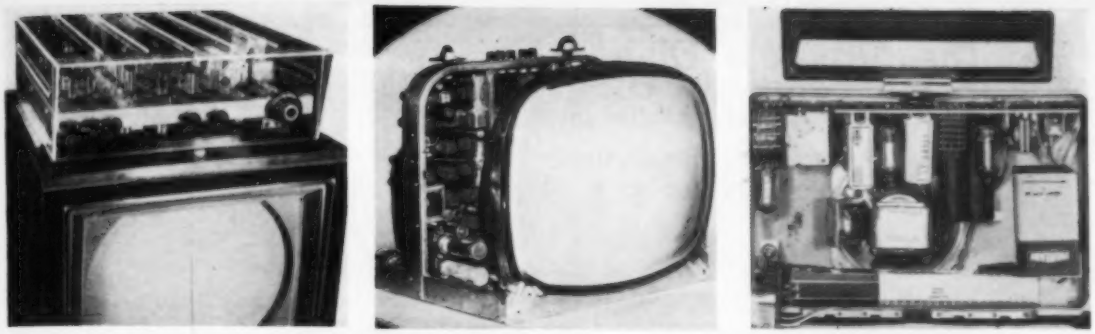

COLOR and black-and-white TV sets and a portable radio show where new electronic modules can be used.

TV: New Outlet for Electronic Modules

Digested from ELECTRONICS, Mar, p12

Three years ago a new development caused a great deal of excitement in the electronics industry. But somehow it never quite got off the ground—at least in civilian applications.

Called "Operation Tinkertoy," and sponsored by the U. S. government, it aimed at a near-perfect automation of electronic-component assembly. Basic ingredient of the process was a thin ceramic wafer, notched around the edges, and impressed with flat electronic parts (like resistors, condensers, sockets). These were automatically assembled and wired to form a rigid structure called a module. Each module was a separate component of an electronic device.

Now, the radio and television manufacturers have decided to go ahead with big plans for modules.

In television — Emerson Radio says it will introduce a modularized TV set. The company, in conjunction with ACF Industries, is currently designing receivers incorporating the components. Du Mont is working on a modularized TV set for possible trial production. Aerovox has worked with five TV manufacturers on production model conversion. Both Aerovox and ACF forsee at least eight modularized TV sets on the market by July, 1957.

One firm is reported to have incorporated modules in a portable industrial 2-way radio. Motorola uses them in a portable radio.

Module makers — Aerovox and ACF are pushing expansion plans for modular electronics. Aerovox expects to have 25 standard circuit modules available next month. These include a voltage regulator, four audio stages, a delay circuit, three high-speed flip-flops.

In the TV receivers shown above, approximately 80% of the components in the black-and-white set and 65% in the color receiver are contained in 17 and 38 modules respectively.

Future—The average black-and-white TV receiver would probably use between 8 and 17 modules and a color set, 25 or more, depending on the extent of the receiver's modularization. With this potention in television alone, module makers are optimistic about future business, and look for module production this year above 4-million units. ◄

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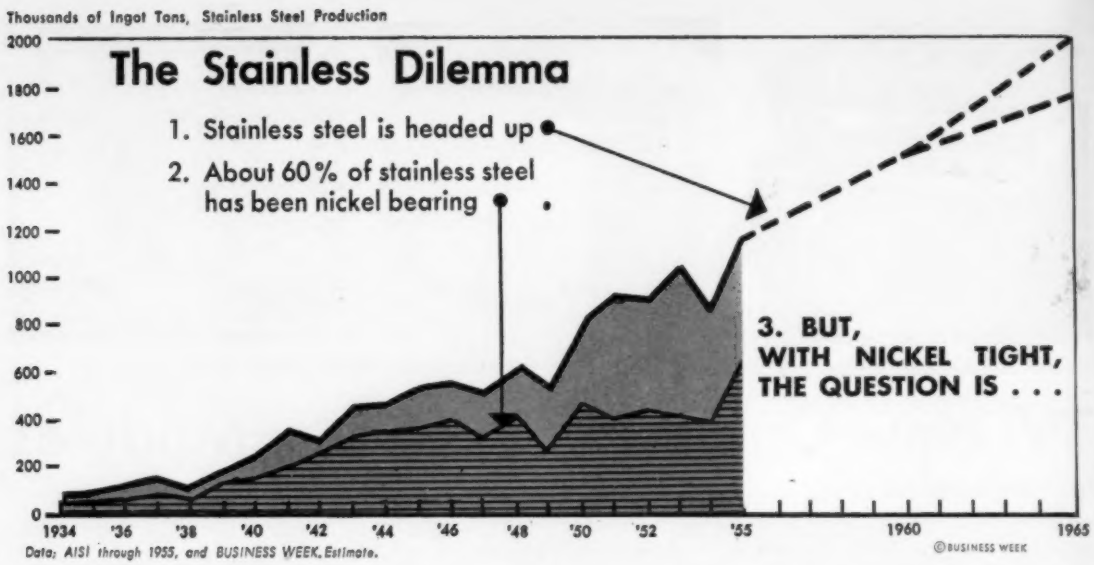

Can Stainless Grow With Less Nickel?

ITEM: Free world production of nickel probably will be almost 220,000 short tons in 1956, up 4% over 1955. Industrial demand for nickel in 1956 probably will exceed the 1955 consumption rate and run ahead of supply. Stockpiles will have to make up the deficit.—ENGINEERING & MINING JOURNAL, Feb, p98

Digested from BUSINESS WEEK, Mar 3, p136

Steel producers now are making more stainless than ever before (chart); and demand is running high. For the future, technology is constantly posing new demands for more and better types of stainless steel. Even so, the producers are worried.

What worries them is a single raw material: nickel. Right now, nickel is short—not just for stainless steel, but for all nickel-using industries. Furthermore, stainless producers feel short supply will continue far into the future.

Producers talk about two solutions to this shortage:

- Divert nickel from national stockpiles.
- Raise stainless prices. A lot of chrome-nickel scrap goes into stainless steel when primary nickel is scarce. And scrap sometimes costs twice as much per pound of nickel content as primary nickel. So a price increase would help offset this higher-cost nickel. But basically it would be unwelcome, since it would only intensify the already severe competition that stainless faces from alternate materials—notably aluminum.

These are admittedly short-range solutions. Long-range the nickel shortage is likely to continue. For the past 15 years, nickel's history is one of shortage. Most stainless men see no change ahead. Nickel shortages have cost stainless some of its old markets, and have kept it out of markets it believes it could win.

More than this, stainless men point to upcoming imperative demands for nickel. Atomics—hardly an industry yet—already takes a lot of the richest nickel stainless for corrosion resistance. Jet engines are using increasing amounts of stainless and the nickel-rich super-alloys. If you look still further ahead, at supersonic aircraft, guided missiles, and gas-turbine autos, you begin to get an idea of the squeeze on nickel.

The more a technology is advanced, and the higher the temperatures that have to be met, the more nickel needed. The tonnage of four common types of chrome-nickel stainless using less than 10% nickel increased 25% from 1950 through 1955 in the U.S.A. The tonnage of six little-used types having more than 10% nickel increased 75% over the same period.

The trend is even more marked when you look at the super-alloys. The nickel content of these metals, one stainless expert says, makes him think of nickel as the base metal and iron as the alloy. As the stainless gets richer in nickel, there is also a tendency towards smaller yields of product per ingot-ton of stainless.

Taken together, richer stainless and smaller product yields mean this: a smaller increase in the amount of product industry will get from future increases in nickel supplies.

Other experts are not quite so pessimistic. They say stainless steel is bound to succumb to competitors in some markets. This is happening right now. Anodized aluminum is making sizeable inroads in automotive trim, once exclusively served by stainless or nickel-plated castings. If aluminum takes over this market, it would free a considerable amount of nickel.

Twenty years ago, International Nickel Co. of Canada was selling its Monel metal to the food processing, restaurant, and dairy industries. Long since, stainless producers have captured and enlarged these markets. They did it with

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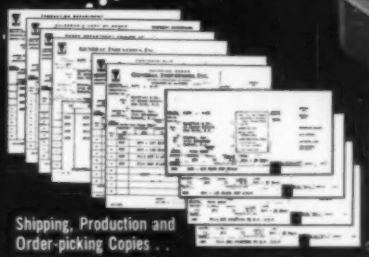

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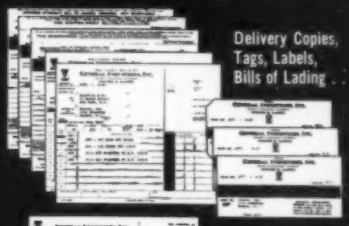

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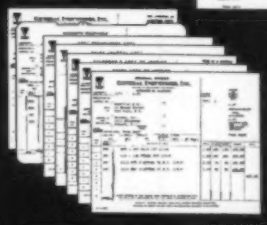

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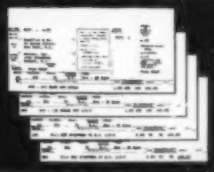

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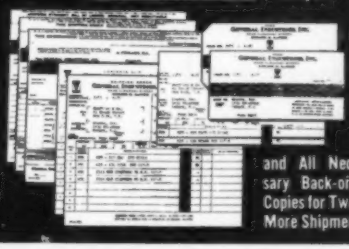

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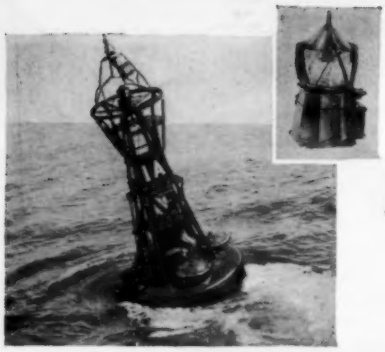

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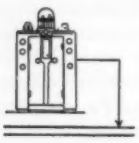
A W&T Buoy equipped with an electrically powered beacon, automatic lamp changer, flasher unit, and radio control equipment is shown above in service at a harbor entrance. Wallace & Tiernan equipment was chosen because of its dependability and economical operation. These qualities are typical of all W&T's navigational aids which include such items as lamp changers, flasher mechanisms, signal timers, fog horns, aircraft flasher units, and other related apparatus.



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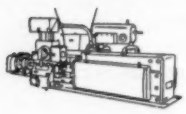

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"Competitive attrition will hold stainless increase down to manageable proportions."

a chrome-nickel type that requires only a fifth as much nickel as Monel.

These and other examples lead some to believe that, even though the future is full of big new nickel applications, competitive attrition will hold the net increase down to manageable proportions.

Still another answer to the nickel-shortage problem may show up. Many producers are working on a stainless steel that will do the job with little or no nickel. But development is far from easy.

For years, stainless producers have had a series of nickel-free, straight chromium stainless steels —the "400" series. For many applications, they are excellent steels —and a good deal cheaper than the chrome-nickel grades of the "300" series. With the Korean war shortage, the trade began developing a new chrome-manganese-nickel stainless called the "200" series.

Steelmen say that the two grades in the series are acceptable alternates in most uses for two of the three most popular "300" grades, and they take about half as much nickel. For all that, demand for the "200" series is not good—even with inducement of a lower price. There are several reasons:

- Many a fabricator prefers the chrome-nickel stainless because he knows it and does not want to try something new.
- Customers are suspicious of the new stainless grades. Korea forced the nickel-free "400" series into uses for which it was not suited. They were harder to fabricate and broke down under highly-corrosive conditions.

A determined drive to get the chrome-manganese-nickel steels fully accepted probably will not get whole-hearted industry support. Not all producers are convinced that these steels—as good as they are—are the best alternatives to be had. Metallurgists have been trying to develop a wholly nickel-free alternate for the most popular chrome-nickel types. That is causing no small worry to nickel producers. ◀

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Plan Now—Defeat Disaster

Digested from AMERICAN MACHINIST, Feb 27, p129

This year, spring — and approaching summer — brings back terrifying memories to many businessmen in the U. S. A. Floods in 1955 (like the one that struck the little New England town in the picture above) cost billions of dollars in life and property, shut down many businesses for weeks and months. Some small plants have never reopened.

More and more, management has come to realize that careful planning, and especially training in emergency procedures, can avert some disasters and limit the effects of others — be they fire, flood, explosion, rioting, storm, or earthquake.

In planning protection you need two practical working tools: a map of your area, and a description of exactly what goes on inside that area.

The map should be on a fairly large scale (at least 1 inch for 1 mile) with your plant as the center of a 10 to 25-mile circle. Industries in the neighborhood, business centers, roads, railroads, rivers, docks, power stations and lines, police stations, hospitals, fire houses, water outlets — all should be shown clearly.

The written description should be detailed, showing your own buildings, sheds, loading areas, product and raw material stores, and personnel distribution. Include a plant layout—showing machines, work areas, tool cribs, storerooms, fire walls, fire doors, escape hatches and ladders, fire-fighting equipment, gas lines, water pipes, sewage lines, conveyors.

Much of this information seems obvious, and not worth putting on paper. But note this: a detailed record of the plant and its surroundings often reveals hidden hazards, pointing the way to disaster protection. It will enable you to estimate your "extent of risk" and plan a realistic disaster control program. As an added dividend, the record may suggest more efficient ways of organizing your day-to-day operations.

Esso Standard Oil Co.—in an industry where fire is a special hazard—is one of a growing number of disaster-conscious concerns. Esso's disaster plan was originally developed as part of the U. S. industrial preparedness program during the Korean War. Esso soon found that its war-time plan could be adapted to peacetime.

The Esso plan—reported in Petroleum Week, Feb 24—covers five main points: (1) creation of emergency control centers for the entire Esso organization, in case any of the present headquarters are destroyed; (2) duplication of vital records on microfilm, stored at these emergency headquarters; (3) standing instructions to all employees in all plants as to their emergency locations and jobs; (4) special training of key personnel—with practical exercises held at the emergency control centers; (5) elimination of fire hazards and the organization of volunteer fire fighting units.

The checklist on the next page covers the major elements of a disaster control plan.

Checklist For Emergency Planning

Planning

Contact local government officials. They have pooled information and experience—free of charge.

Visit neighboring plants. Enlist their support. Coordinate plans.

Survey hazards in your plant. In many cases insurance premiums will be lowered when hazards go.

Appoint a program director. Provide him with needed personnel, protective equipment, adequate office and communications—and authority.

Present program to employees—use wide publicity. Discuss with union.

Call an organization meeting of all key personnel. Introduce the program director. Make clear his authority.

Compile a disaster-control manual. Outline program in detail; fix policy and procedure.

Training

Program director should begin part-time study of disaster control. Some large universities offer related courses. Local fire, police, and sanitation departments, hospitals, insurance companies, can furnish information, recommend reading.

General instruction for the workforce is essential. Rank-and-file workers should be trained in self-help at times of emergency—care of person, care of machinery, aid to injured, rescue, fire control, protection of property. Shutdown, exit drills are vital.

Special training should be given to company guards, policemen, fire officers, nurses, telephone operators. It is especially important that corresponding municipal or state agencies be contacted by these groups.

Mutual Aid

Neighbors are an asset—get to know their ideas on disaster control. Start mutual planning.

Solve mutual vehicle traffic problems—approaches to parking areas, loading docks.

Standardize hose couplings so that fire hose from any plant in the area is usable in other plants.

Exchange lists of service equipment; prepare a joint inventory. Plan purchase of needed big equipment—fire trucks, ambulance, warning siren, etc., on a cooperative basis. In some cases personnel might be employed jointly.

Plan emergency, mutual use of power, water, communications.

Arrange emergency hospital facilities and first aid on a mutual basis.

Deconcentration

Find a second source, if any one critical item is produced exclusively in your plant.

Or check the possibility of having part of this work done outside.

Consider a way to divide highly skilled personnel in special pursuits who are now under one roof.

Use spread-out, protective construction in building new facilities.

Arrange alternate locations for storage of materials, machines and equipment.

Locate alternate transport.

Redesign parts—it may help you use more standard items, available from outside suppliers.

Separate hazardous operations from other parts of your plant. Isolate dangerous materials.

Executive Survival

Alternate headquarters should be planned. Cost can be low. Homes of key executives can be designated as emergency headquarters and, in some cases, small amounts of equipment—files, typewriters—can be moved in crates to private basements. Each key man is assigned to one of several private "reporting centers."

By-laws of corporation should be filed in attorney's office and, in some cases, with civil officials. This should enable surviving directors and officers to take official action in emergency.

Succession of named persons to key executive and technical positions should also be provided.

Emergency finance plan should be worked out with your local bank. Also establish credit outside your area.

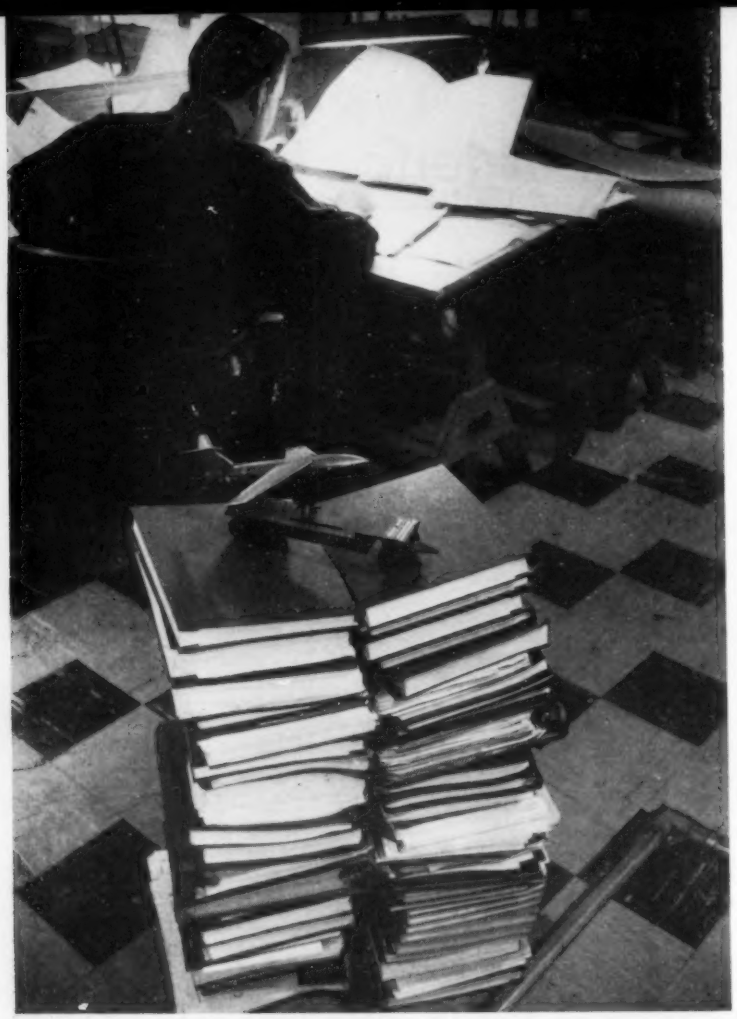
Records

Evaluate your documents and records. Divide them into four classes: (1) vital records—those needed to recover money; to continue production, sales. (2) important records—those which would be quite expensive to reproduce, in money or time. (3) useful records. (4) non-essential records.

Label each record (1), (2), (3) or (4) or use color codes or colored paper to classify all items.

Train office people in how to protect records (1) and (2) in an emergency.

Duplicate records in classes (1) and (2)—by photocopying or microfilming, if possible—and store outside the plant. Consider cooperative purchase with neighbors of microfilm machine.



Instruction Books: A Key to Easier "Repeat" Sales

Digested from BUSINESS WEEK, Mar 3, p152

"Shake well before using—the old adage first found on patent medicine bottles—was one of industry's first "instruction books" for customers.

Today, if you purchase aspirin you get at least two or three paragraphs of instruction. If you buy an airplane or an electronic computer you get a small library of books telling how to run the machine and maintain it. The pile of books above is just a small part of those needed for a guided missile project.

If a product is going out of your plant without complete, clear instructions for the user, you may lose customers and all-important "repeat" sales. Customers expect plenty of service with whatever they buy. The instruction label, or booklet, or shelf of heavy service manuals, is part of that service. Good manuals create good will for the product and its maker, plus more effective use, plus, of course, more satisfied customers.

World War II demanded a flood of handbooks and manuals, to enable non-technicians to handle complex military equipment. Since then the trend has continued into government business—and into ordinary consumer industries, too. A housewife needs a set of directions before she can run her refrigerator properly (at least a small booklet). And, on top of that, it takes a much larger handbook to provide maintenance and repair information for the men who will service the refrigerator.

But many companies find it difficult to turn out manuals themselves. This has created a new industry in the U. S. A., where a corps of about 100 companies, doing a $50 to $100-million yearly business, provide technical writing services. One large New York City agency employs about 1,000 workers. Many companies, of course, employ their own technical writers as permanent staff.

If a handbook is for a consumer product, instructions have to be simply stated and clear enough to be understood by customers who have absolutely no talent or experience with mechanical problems or technical language. An engineer working in a plant usually is not trained to write on this level. The answer is to employ a writer who has, at least, a fair amount of technical understanding.

Even for highly complex industrial products, simplicity and clarity are important. Here again, manuals must be on the understanding level of an operator who is not an engineer. And for government contracts, of course, the manual must usually cover everything in great detail.

Hiring the technical writer—a man who can describe a machine in layman's language—is no easy personnel job. He may be hard to locate; and once found, he may make salary demands beyond your budget. Nonetheless, if your line is competitive and your products are at all complex, there may be no safe way to avoid hiring him—sooner or later. He is fast becoming a necessary link between the manufacturer of complicated equipment and the user.

Some technical writing jobs require an engineering education—many do not. Some concerns claim their best operating handbook men are non-engineers—writers with high mechanical aptitudes and interests. Most of the companies that have hired technical writers have found that they can take over a number of writing jobs that were cutting too deeply into the time of professional engineers. ◀

Getting Your Share of Talent?

- **With highly trained personnel in short supply, thousands of companies are adopting an aggressive, competitive recruiting policy.**
- **Personnel men are "selling" their companies to college graduates—and sometimes to the trained employees of competitors.**
- **Starting salaries: high, and going higher.**

The Economist (London) says, "The great cry in the West is for skilled labour, particularly for engineers and chemists . . ." *The Times Review of Industry* (London) discusses the serious "shortage of skilled workers" in Europe . . . *The Wall Street Journal* (New York) is reporting on the increasingly aggressive personnel recruiting in the U. S. A. The fact is, everywhere in the world where industrial jobs are becoming more and more complex and extensive, there is a great shortage of technical skill.

The U. S. A. has been especially hard hit by a dearth of highly trained people—mainly engineers. The reaction of industry has been sharp and fast. Now the big emphasis in personnel management is on recruitment — hard-hitting recruitment that puts the new college graduate in a golden position, and forces competitors to make special efforts to retain talented men who are desperately needed elsewhere.

College recruiting in the U. S. A. is big business, according to a *Wall Street Journal* survey. With June graduation just a few weeks away, an estimated 5,000 concerns have sent recruiting teams to college campuses. Industry is competing not only for engineers and scientists, but for liberal arts and commerce graduates, too. Starting salaries are "sky high." So are recruiting costs.

• Notre Dame University in Indiana has had 310 companies recruiting on its campus, compared with 275 in 1955. About two jobs in industry are available for each student.

• Columbia University, New York, is literally overflowing with employment interviews. Three hundred companies are active. Interviews are held from 9:00 AM to 8:00 PM—and a hotel is used for extra office space.

• Pennsylvania State University reports that "there are 12 to 15 jobs for each engineer, 8 to 10 for each teacher, 5 to 6 for every business administration graduate, and 3 to 4 for each liberal arts student."

• Monsanto Chemical Co. is trying to hire college faculty members to help in recruiting college students in future years.

• U. S. Steel Corp. wants to hire 850 engineering graduates this year; Pure Oil Co. is looking for 50; Standard Oil of Indiana wants 50 to 75. General Electric hopes to hire 2,000 "technicians." All employ traveling recruiters.

• General Motors Corp., says *The Wall Street Journal*, has nine full-time recruiters working at 125 colleges, to hire about 1,700 graduates in 1956.

• Caterpillar Tractor Co. is "looking for the man, not trying to fill any special job . . . We can always fit a good man into our growing organization," says a company official.

• Ferro Corp., Cleveland ceramics manufacturer, has taken on a tremendous recruiting job—reported in a recent issue of *Chemical Week*, New York. Ferro—as part of its sales and service program—actually hires engineers, trains them for 1 to 2 years, and releases them to selected Ferro customers. They work permanently in the customers' plants. The idea was started 20 years ago. Today, almost 50% of the ceramic engineers in the porcelain enameling industry in the U. S. A. are Ferro "graduates"—they leave Ferro at the rate of at least four each year.

Getting recruits is Ferro's big problem. The company offers the new engineer a choice. He can (1) stay in Ferro's home laboratory, (2) work in one of the firm's 11 overseas plants, (3) work in sales in the U. S. A. or abroad, or (4) train for employment with one of Ferro's established customer companies.

Ferro's annual contest for engineering graduates has been an effective recruiting aid. Contestants write a 3,000 word essay on "any phase of porcelain enameling." The entry list for the contest, and especially the list of top winners, gives Ferro a valuable list of recruitment prospects.

• "Thousands of companies"—says *The Wall Street Journal* survey—that are unable to send recruiters to colleges, mail out huge quantities of literature to students. In many cases, even undergraduates who will not enter industry for two or three years are sent company information — often followed up by interviews during their final school year.

Starting salaries for trained men have soared. The college graduate can expect from $350 to $450 a month, depending on his special training. This is roughly $10 to $25 higher than salaries offered in 1955. There is virtually no ceiling on salaries for engineering graduates who also have a few years' practical experience.

Many concerns pay the new man his cost of transportation to the job location, first for a visit before hiring, and again when he begins work. A 1000-mile trip is not at all unusual. Most companies pay married men the cost of family transportation, too—plus the expense of moving furniture.

Marketing research techniques might be profitably used to put recruiting on a scientific basis. The idea, reported recently in *Personnel Magazine*, has been suggested by Dr. George Ebey of Stanford University, California. He makes the

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Digested and compiled from The Wall Street Journal, Chemical Week, Personnel, Economist (London), Times Review of Industry.

project sound practical, workable.

Why not research the motivations and attitudes of potential employees? Dr. Ebey thinks that personnel managers could gain a wealth of information to aid in recruiting — especially on college campuses. After all, he says, personnel departments—searching for high skills—have found themselves faced with a buyers' market. Researching the "market" should help personnel men in planning their competitive recruitment programs.

Stanford Research Institute tried the idea recently. It surveyed 1,397 students — questions were asked with reference to one particular industrial company. Findings revealed (1) why the students felt as they did toward the company and its industry; (2) how the company could improve its distribution of recruitment literature; and (3) what new kinds of media would be more effective in attracting high-quality employees.

Upgrading personnel takes the strain off the employment department. *The Wall Street Journal* says that more and more companies are fighting the skilled labor shortage by using two-year "technical institute" graduates and specially-trained high school graduates in jobs that would normally be filled by graduate engineers.

Standard Oil Co. of Indiana has been using "sub-professional" employees in engineering jobs since the 1930's, according to a company official. The company now has 1.9 "technicians" for each engineer. American Bridge Corp. has 800 technicians and 700 engineers. "For the first couple of years after graduation, a college-trained engineer is about equal to a good technician in routine work," says a company official.

Operating mechanical calculators, pilot plant equipment, and laboratory equipment, and engineering testing, are jobs often handled by engineers that can be done as well by technicians. General Electric Co. strengthens its force of technicians by assigning them to various jobs for three-month periods. About 70% of the company's technicians — many of them only specially-trained high school graduates—are taught to successfully perform engineering and laboratory jobs. ◀

BRITISH APPRENTICES pursue intensive mechanical courses at the Billingham plant of Imperial Chemical Industries, Ltd. That is one way . . .

ICI Fights Skill Shortage

Digested from CHEMICAL WEEK, Mar 17, p38

Next month at Billingham, England, the largest chemical concern in the British Commonwealth will open a $250,000 school building. The new school, using a full-time training method instead of on-the-job instruction, will attempt to turn 16-year-old recruits into skilled craftsmen. Imperial Chemical Industries (ICI) is not relying on outside educational institutions —and for good reason.

The supply of skilled manpower is way below demand in Britain. The shortage extends from professional engineers down to mechanically trained high-school graduates. ICI concentrates on training technicians at the lower level—mostly young men who can be retained as career personnel.

The manpower crisis in Britain was foreseen years ago by ICI. As far back as 1941, the company appointed a full-time apprentice supervisor to lay the groundwork for a technician training program.

The training school—a departure from on-the-job training—was first started by ICI at its huge Billingham plant in 1946. Converted factory buildings were used for class rooms, the school could take only 57 boys at a time. Results were favorable, so management soon extended the plan and set up the "full-time" apprentice training school that will, in a few weeks, be installed in its own new private building.

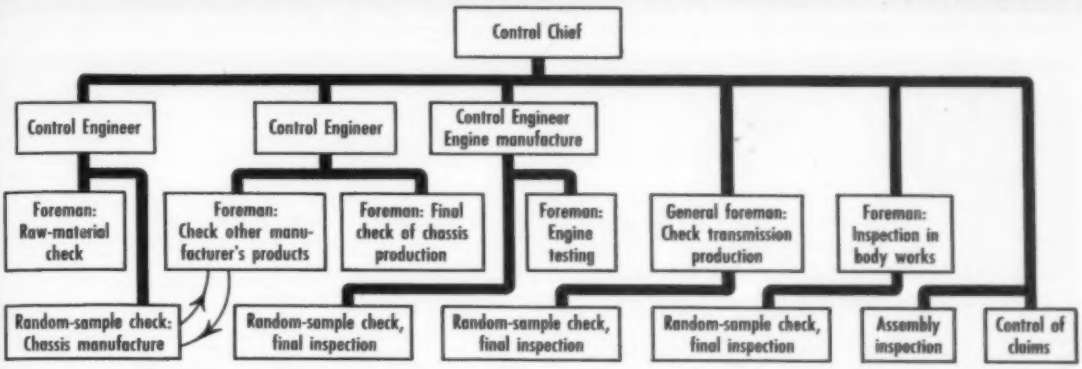
Full-time training is the feature that makes ICI's school outstanding in industry. The American "on-the-job" method—used by such chemical concerns in the U. S. A. as du Pont, Dow Chemical and Union Carbide, plus hundreds more—is not well suited to ICI, say company officials.

Student-employees are started through the school in classes of 100 each. All 100 boys are sent first to the Fitting Bay where they are taught the use and care of hand tools.

After three months, 30 boys are selected for an additional three months in the Handicraft Bay. There they get basic training in several skills—welding, plumbing, brick-laying, etc. This completes their training and fits them for general maintenance work.

The remaining 70 boys, after four months in the Fitting Bay, go to the Machine Bay for four months of machine-tool practice. Finally, they go to the Production Bay for another four months, to study a single specialty—pipefitting, instrument techniques, tool making, and so on. ◀

HOW SCANIA-VABIS ORGANIZES FOR QUALITY CONTROL



Swedish Company Stays Competitive

Scania-Vabis, small automotive manufacturer, maintains superior quality—yet stays competitive in world markets by stressing (1) specialization, (2) standardization, and (3) planned quality control.

Digested from INGENERIA INTERNACIONAL INDUSTRIA, Mar, p50

A. B. Scania-Vabis, Sodertalje, Sweden, produced its first vehicle in 1897 and claims to be the oldest automotive manufacturer in the world. Since that pioneer date, the company has constantly redesigned not only its trucks and buses but also its management technique.

Today, Scania Vabis is a streamlined operation. It is a medium-sized firm — quite small by automotive standards — that has learned how to keep itself competitive in both domestic and world markets. It follows a clean-cut, three-point plan of efficiency —combining specialization, standardization, and quality control.

Nowhere in the plan is there any sacrifice of Scania's quality standards. "Quality control" is an integral part of all manufacturing.

Specialization—Unlike a great many small and medium-size companies in Europe that manufacture a wide variety of products, Scania decided long ago to confine itself to a few promising, salable items. Today the company specializes in heavy duty trucks, heavy duty buses, and diesel engines. Market studies pointed these out as the best lines for both immediate markets and long-term growth. The company (with 2,600 employees) today produces 4,000 truck and bus chassis each year, plus 1,000 engines for other purposes.

By specializing, Scania has been able to: (1) purchase materials and parts from fewer sources and often at lower prices; (2) lay out the operation in a pattern of fewer production lines and assembly units, getting faster output and handling; and (3) maintain quality standards with much less effort than would be needed if many items were made under the same roof.

Standardization — The program touches every operation, and helps to cut costs substantially. Wherever possible, interchangeable parts are used. For example, cylinders, cylinder heads, pistons, and connecting rods, are the same in all four engine models. (Scania makes 4-cylinder, 6-cylinder, and 8-cylinder engines.)

Specialization and standardization have greatly aided Scania's international marketing operation. A big world market exists for truck and bus chassis, and there is a strong preference for diesel engines in many nations. Concentrating on specific markets and standardizing its products with interchangeable parts has helped Scania remain in a strong competitive position.

Quality Control — The maintenance of high quality standards is a vital part of Scania's operation. More than any other factor, its control plan has enabled the company to keep quality high and prices competitive.

Over 3,000 parts are made and assembled in Scania's factory. To insure quality, the company maintains a control organization of 100 people headed by a chief engineer (see chart above). The control group actually is a superstructure of inspection personnel that parallels all levels and departments of the production organization.

In some cases, foremen are given supervision over both inspection crews and production crews.

Manufacturing is divided into a number of small sections, each feeding into a general assembly line. Each section, as well as the connecting assembly line, has its own quality control operation. The same applies to all operations —before the actual fabrication of parts, and after the assembly of complete units.

A cylinder block, for example, goes through seven stages of inspection: (1) material analysis before casting, (2) checkpoint after moulding and cleaning, (3) checkpoints during machining—along 38 stations—with a member of the quality control staff following the unit and sample-checking at various points, (4) final inspection after finish-machining, (5) checkpoint at engine assembly line, (6) bench test of engine, and (7) final road test of vehicle. ◄

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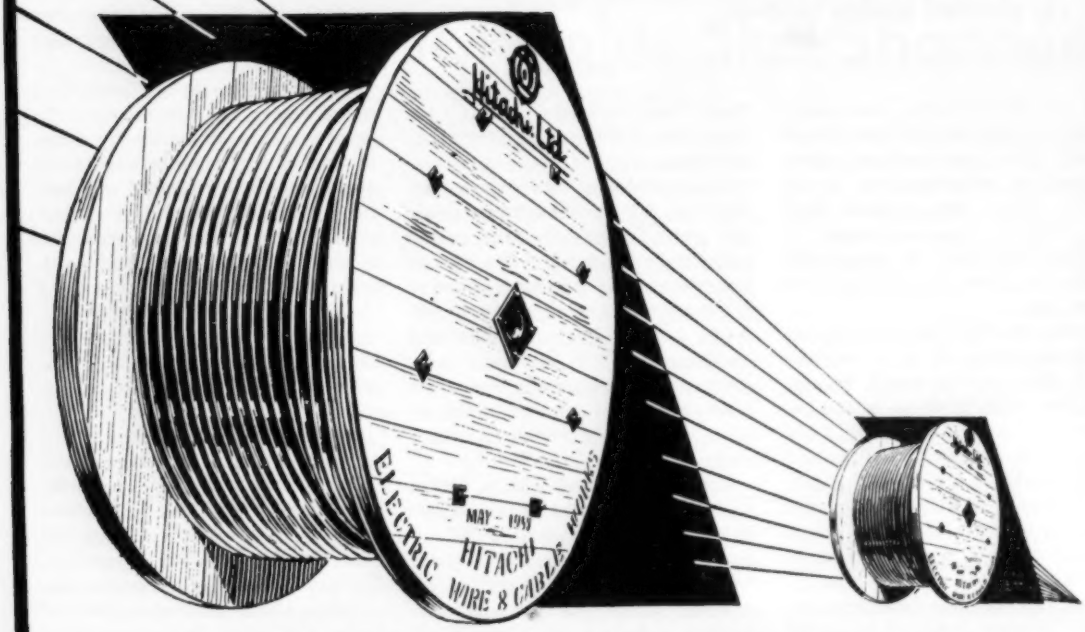

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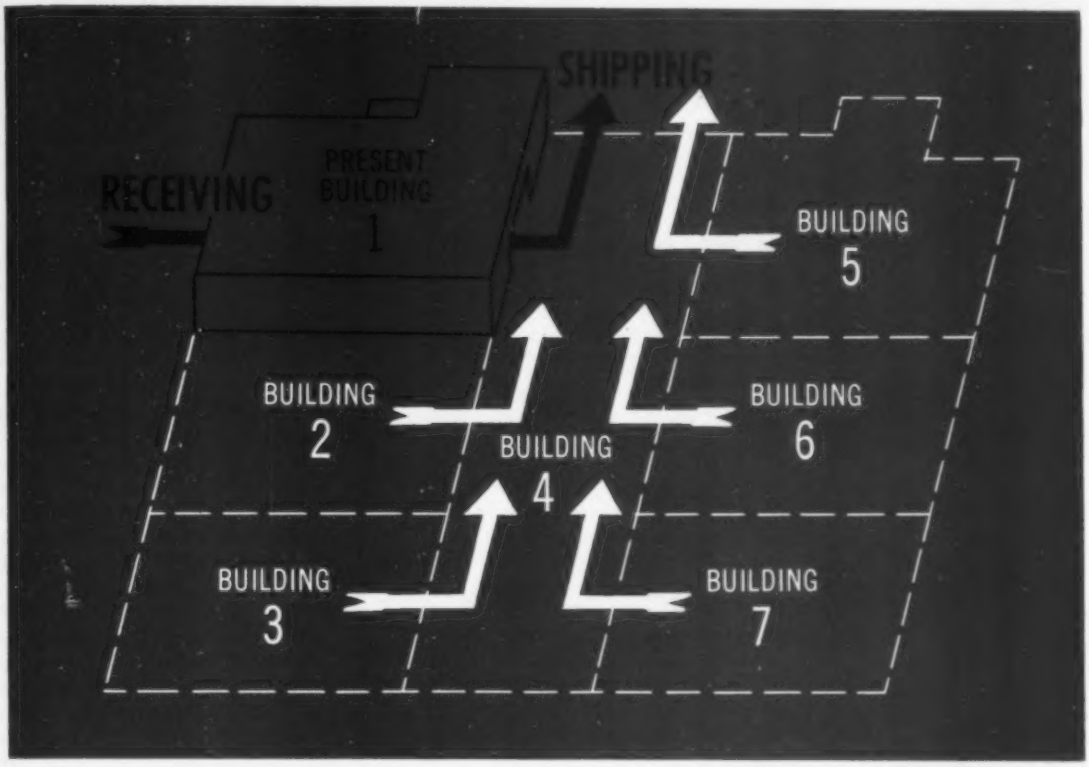

ADD-A-PLANT technique requires careful planning for future expansion. Diagram above shows how Hightstown Rug can enlarge its plant to six times its original size: Just build onto the basic plant and service facilities.

Plant Plans for the Future

Digested from FACTORY MANAGEMENT & MAINTENANCE, Mar, p127

This new plant is relatively small today. Its 52,000 square feet is shown in white in the diagram above. But executives of Hightstown Rug Company (Hightstown, N. J.) have the future much in mind. They look on this plant as the keystone for:

1. Expanding production capacity to meet the need of increased business (into buildings 2 and 3).
2. Combining buildings 1, 2 and 3 under one roof that includes building areas 5, 6, and 7).

Here's the long-range plan as outlined by the plant manager: Arrow shows material flow in building 1. To allow for expansion, outer walls are demountable steel siding, bolted into place. They are removable and reusable. After buildings 2 and 3 are added, rugs can still be shipped from docks at the ends of the buildings.

The building 4 area will be enclosed when buildings 5, 6, and 7 are added. It then becomes a centralized shipping department, with space for additional warehousing. Raw materials used on each side are sufficiently different to justify receiving docks at both ends of plant, an arrangement that also reduces in-plant handling. Flow will then be from ends to center—and out.

In planning for this future growth, the company has a host of cost- and time-saving ideas already built into building 1:

- Columns are oversized so they can support added weight of adjacent buildings and craneways.
- Craneways are extendable.
- Boiler house has room for a second boiler. But present boiler can take care of four building units—on high pressure. It satisfies needs now on low pressure.
- Service pipe lines are extended through building 1 for ready expansion into new building units.
- Air compressors are powerful enough to handle the needs of three buildings.
- Electrical substation has enough capacity for three building units. When needed, a second substation will be added.
- Bus duct running along the outer wall of building 1 is of sufficient size to take care of half the requirements of building 2.
- Water-well pump and overhead tank have enough capacity to supply all requirements of ultimate plant.
- Underfloor drains are sized for needs of buildings 1, 2, and 3. ◀

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Trends In Construction

Digested from ENGINEERING NEWS-RECORD

In Russia, Cement Sets Fast—Soviet reports talk of a way to shorten cement-setting time. Extremely fine cement in Russia reaches a 24-hour strength nearly twice that of ordinary cement.

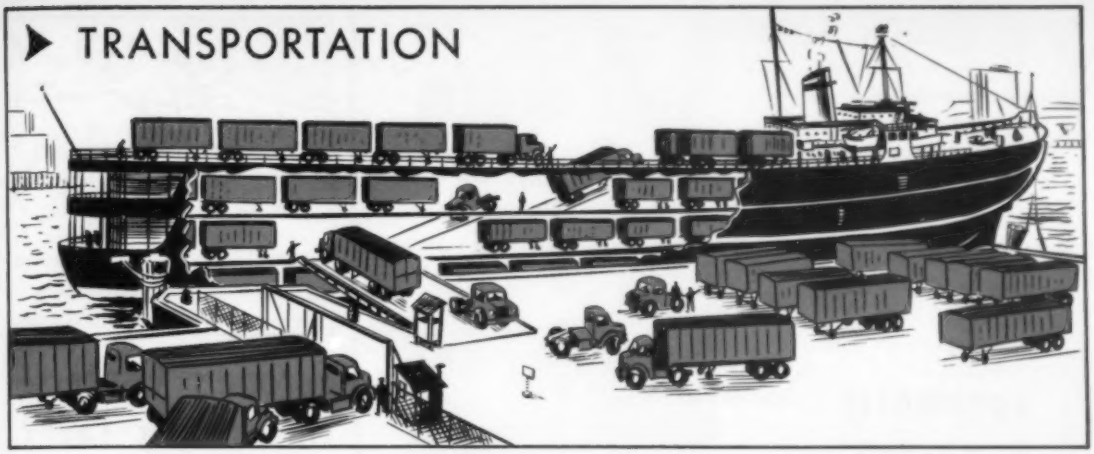
The fine cement has a specific surface area between 5,000 and 6,000 square centimeters per gram, compared with American high-early strength cement which has about 3,800 square centimeters per gram.

Two methods are used to produce the cement: (1) Collecting cement dust at filters in cement plants. Up to 2 tons per hour can be collected this way. (2) Passing ground cement through a second grinding process which produces a still finer cement.

World's Longest Cable Spans 12,000 Feet—Electric power is fed to Sicily through cables spanning the Messina Strait at Italy's "toe." Gigantic lattice towers were required to support the cable over an 11,980-foot span.

The towers are 735 feet high and are designed to withstand winds up to 93 miles per hour, a constant cable pull of 27½ tons and earthquakes. Horizontal crossarms measure 246 feet from end to end and carry four 1.1-inch diameter steel-aluminum stranded cables. Extensions above the cross-arms provide hangers for more cables.

Periphery Cable Keeps Bullring Stable — Concrete stands of a unique cable-cantilever design are being built for a large bullring in Cali, Colombia. Designed to hold 20,000 spectators, the 24-sided bowl consists of concrete bleachers that cantilever 50 feet (radially) outward around its periphery. The main support for the polygon comes from two sources: (1) 24 reinforced concrete ribs that reach 50-feet radially outward from a base slab, and (2) 15 rings of post-tensioned cables that circle the upper half of the cantilever, continuous around the structure.



Coastal Shippers Turn to Wheels

Digested from BUSINESS WEEK, Mar 24, p180

Coastal shipping in the U.S.A. has been a sickly industry since World War II—at least as far as dry cargo is concerned. Now an idea that dates back to the first ferryboat hauling a vehicle may pull some of the shippers out of their doldrums.

"Roll-on, roll-off" cargo handling, pictured above, is expected to cut costs tremendously, and speed up coastal shipping services. The idea is to leave the freight sealed in truck trailers (or railroad cars) and roll these on and off specially constructed ships. Promoters of the plan say it may revolutionize domestic shipping in the U.S.A. and, eventually, in other countries.

Coastal shippers in America—excluding carriers of bulk cargo like oil, coal and ore—have been operating at low profit levels for years. Moreover, their freight volume has dropped 60% since 1939. High cost—and therefore high charges—are the big problem, along with slow service that fails to compete with railroads and trucking lines.

A large part of the trouble lies in cargo handling. Coastal vessels stop frequently at closely spaced ports. Loading and unloading is slow, laborious, and costs a fortune in wages. The time taken for handling varies greatly, as does the cost in wages. But for an average full-cargo trip, the handling time alone will range from 2½ days to 6 days, and the labor cost will consume over 50% of the gross revenue. (In the U.S.A., the labor costs figure is up from 43% in 1950.)

Roll-on, roll-off avoids most of the handling. Cost for handling drops to less than 3% of total freight revenue. Besides, most cargo handling can be accomplished in one tide, thus greatly speeding shipments. But roll on, roll off ships are new in design and expensive. And they must be fast to be competitive.

Cost of constructing the specially-built ships is the rocky shoal that promoters are trying hard to sail through. Financing—for Pan Atlantic Steamship Corp., for example—has proved slow and complicated. The company's projected seven "roll-on ships" for highway trailers are still on the drawing boards. When completed (two to three years from now) they will each carry 288 truck trailers, 35 ft. length. Total cost of the seven ships will be about $71-million.

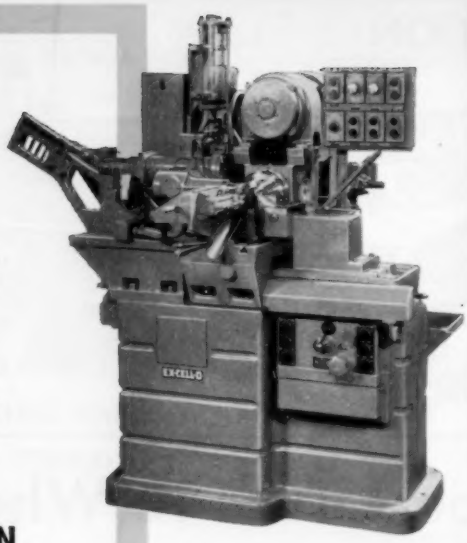
TMT Trailer Ferry, Inc., using converted LST landing ships, since 1953 has operated a highly successful "vehicle roll-on service" connecting island ports in the Caribbean Sea. TMT has one big advantage that coastal shippers do not enjoy: no competition from the truck lines and railroads.

Labor union troubles are a possible obstacle to roll-on, roll-off. Waterfront workers in the U. S. A. (and other countries) are expected to react strongly to any threat to loading and unloading jobs. ◀

Vessels Get Versatile

S. S. Tropicana, owned by Prudential Steamship Corp., New York, has begun hauling orange juice—vacuum packed in huge stainless steel containers—from Florida to New York. Cost of shipping 1.5-million gallons is $15,000, compared with $250,000 for overland truck shipment. The Clifford J. Rogers, plying between British Columbia and Alaska, now carries 168 steel cargo containers—each 7 feet by 8 feet by 8 feet. In port, the containers are hauled out by crane and placed directly on railway flat cars. In Holland, the tanker Gerritje has been refitted to haul Heineken beer. Cost: 50% less than by rail tank car. Two big ships recently bought by Royal Dutch Shell carry hot asphalt—kept at 285°F. in special oven tanks. (The Wall Street Journal, New York)

Ex-Cell-O Style 2112-B Precision Boring Machine equipped with a single work spindle and special work handling devices for automatic loading, machining and ejecting.



AUTOMATIC HANDLING SPEEDS PRODUCTION ON A STANDARD Precision Boring Machine

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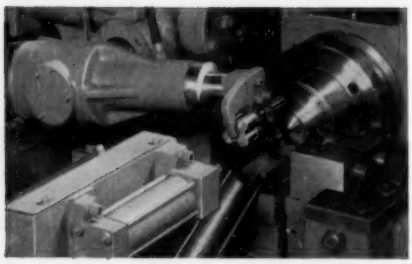
This standard Ex-Cell-O Precision Boring Machine is equipped for facing both ends of oil pump impellers. With automatic work handling equipment it operates at a net production rate of 156 pieces per hour. The use of a standard machine keeps the original cost at a minimum.

In a completely automatic cycle a loading arm picks a part from a chute and loads it into the chuck, then the parts are clamped, machined and ejected.

The flexibility of standard Ex-Cell-O Machines permits low cost automated operation with the addition of work handling equipment. Such a machine may be profitable in your plant. Wire or write Ex-Cell-O in Detroit.



The loading arm is about to load the part into the chuck. After machining, part is ejected into chute in foreground.

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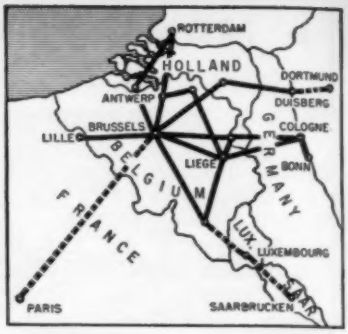


Europe's 'Copters: Tomorrow's Taxi?

Sabena Belgian World Airlines has tremendous faith in the future of its 6-year-old mail and passenger helicopter service, operating a network in Western Europe—in spite of high cost and no profit, to date.

Sabena, with a fleet of six U. S. A.-made Sikorsky S-55 helicopters (7 passenger), links Brussels with 10 cities in Belgium, Holland, France, and Germany. By mid-August it expects to extend the network to downtown Paris, deeper into Germany, and to the Saar, using eight new 12-seat rotor planes. Cost: $2-million.

On the map above, the heavy solid lines show Sabena's present-day network; the dotted lines show the expansions scheduled for summer.

Actual flying time for the 78-mile run from Brussels to Rotterdam will be 70 minutes with the new equipment. This compares with 170 minutes for 250-mile-an-hour "fixed wing" craft—counting two hours for registration, loading, and travel to and from the airports. Safety is another selling point, with 1.5-million miles flown without a serious accident.

Cost is the big problem. The S-55 helicopter is five times as expensive to run, per seat-mile, as a short-haul conventional transport plane. Cost per mile per plane is $1.12; revenue if plane is full is just 67.5 cents. Bigger planes and faster service are the answer, say Sabena officials. They hope that by the early 1960's the service will be self supporting. (Reported in The WALL STREET JOURNAL, Mar. 13, p 1.)

▶ FINANCIAL DIGEST

There's more worry in Canada about inflation. The reason: Canadian management men have raised their sights on **capital spending** to a new high. **Spending may hit $7.5-billion in 1956—21% over last year.**

If it does, the prices of shortage materials —like steel and cement—**and the cost of scarce labor, are apt to hit new highs, too.** (And imports would increase at a time when the foreign trade balance was already chalking up bigger and bigger deficits—from plus $3.5-million for January 1955 to minus $38.7-million for January 1956.) **The Bank of Montreal wants a slowdown in spending**—wants the Bank of Canada to impose reasonable "monetary restraints."

Meantime, Ottawa has put gold into people's minds. Trading restrictions have been lifted. Canadian mines can now sell gold to the public (or to foreign buyers) for hoarding or exporting — without government interference. Short run, there will be no great change in Canadian or international gold operations. **Long run, the result may be a thriving free gold market in Canada**—one that could compete with London's market, and in time, bring foreign funds into the Dominion.

✦ ✦ ✦

"Variable" annuities are in the news again —in the U.S.A. The big insurance companies have revived a four-year-old fight. The question, according to *Wall Street Journal* reports: Should they be permitted by law to sell this special brand of **"inflation-proof" insurance** to the public?

Under a "variable" annuity contract the insurance company is allowed to invest its policy-holders' premiums in common stocks. The old 'safety rule" that limits the company to bonds, mortgages; and other conservative securities is dropped. **The risk is passed on to the policy-holder.** He is guaranteed no fixed sum when the term of his annuity expires; what he gets depends entirely on the success of the common stock investments.

It amounts to a hedge against inflation—or an attempted hedge. If inflation pushed up the cost of living, stock prices and dividends would tend to go up, too. So say the proponents of the variable annuity. (For a further look at the international approach to the "inflation-proof" investment, see "Hedging Against Inflation," MD, April.)

Chile has a chance to stem the tide of a ruinous inflation that has plagued its economy since World War II. **The worldwide copper boom**—plus an expected increase in nitrate exports—**should give the government enough added revenue** to complete a three-part program recommended by Klein & Saks, a Washington consulting firm that has helped Peru get out of financial trouble. K-S wants Chile **to drastically curtail credit** (already begun); **to set up a currency stabilization fund** ($75-million just borrowed from U.S.A. sources); **and to encourage increased foreign investment** (Anaconda Company—the copper producer—announced it is putting another $100-million into Chile).

The over-all plan has already started to get results: **The peso-dollar rate is now down to 500 from last summer's high of 800 to the dollar.**

✦ ✦ ✦

Bonds issued by the World Bank—payable in dollars—are getting so popular (in the U.S.A. and elsewhere) that some issues are drawing **higher prices than comparable bonds sold by the U.S. Treasury.** Three factors explain the investor reaction, according to a recent *Journal of Commerce* report: (1) There is a **U.S. tax exemption feature,** by virtue of treaties between the U.S.A. and other nations. (2) The Bank **inspires great confidence** around the world—it has never had a loan default. (3) **Pension and trust funds** in the U.S.A. are buying World Bank securities to diversify holdings.

The Bank is "poised for more lending"—with ample cash available. But so far this year only one loan has been made ($8.1-million for a Japanese project) as against 27 loans totaling $410-million in 1955. **You can expect a big lending increase later this year.**

✦ ✦ ✦

Electronic Banking: First National City Bank, New York, says it is the first bank in the world to process as much as 85% of its business loan accounting with an electronic digital computer. First National City does a business loan total of some $2.1-billion yearly, claims the machine can do the work of two men, working all day, in 12 minutes. The machine: Burroughs Corp.'s E-101, making its first appearance in industry and commerce at the bank. Fourteen others are in use at universities.

Financial Digest, compiled from various sources, analyzes current financial trends and underlying factors.

Miniature paging receiver

Lightweight two-way radio

Musical telephone

Products Use More Transistors

Additional markets for the transistor are opening up in communications. Here are some new products built around these tiny substitutes for the vacuum tube:

Pocket Radio Pager—Put it in your pocket or hang it on your belt and no matter where you go, your office can find you. The pocket pager can single out a particular person anywhere in a large plant area. It sounds an alerting buzz and then delivers a voice message to the single person being paged. An optional hearing-aid type earpiece or a lapel-type speaker make incoming messages intelligible in high-level noise areas.

A base station goes with the pager; it is used to make contact with any one of a number of pagers in its vicinity. **(Motorola Communication & Electronics Inc., 4501 Augusta Blvd., Chicago 51, Ill.)**

Two-Way Radio—This portable two-way radio gets its light weight from a design using space-saving transistors instead of conventional tubes. Application shown above (center) simplifies inventory taking. The clerk reads the inventory item into the unit's microphone; from there, it is transmitted to an office where it is recorded.

Four models are available. Weight range of the group is 7 pounds 9 ounces to 15½ pounds. **(Motorola Communications & Electronics, Inc.)**

Telephone—A musical tone generated by transistors is replacing the bell in telephones now being tested by the U.S.A.'s Bell System. Tone seems better for older people who cannot hear the high-frequency components of telephone bells. The tone cannot be confused with doorbells, alarm clocks, and kitchen timers.

Still another transistor device for the telephone is an auxiliary amplifier. It will make life easier for the hard-of-hearing by amplifying incoming signals. **(Fisher Research, Palo Alto, Calif.)**

Hearing Aid—A new self-contained hearing aid is placed in and behind the wearer's ear where it is hardly noticeable. The aid uses four transistors. **(Sonotone Co., Elmsford, N. Y.)**

Machine Combines Hobber and Shaver

ON a completely new range of machines, one machine and one operator can perform both hobbing and shaving operations. The machines are particularly useful in making large turbine gears. A considerable amount of time is lost in shifting the gear from a hobber to a shaver in conventional setups; also machining accuracy can be upset by the shift.

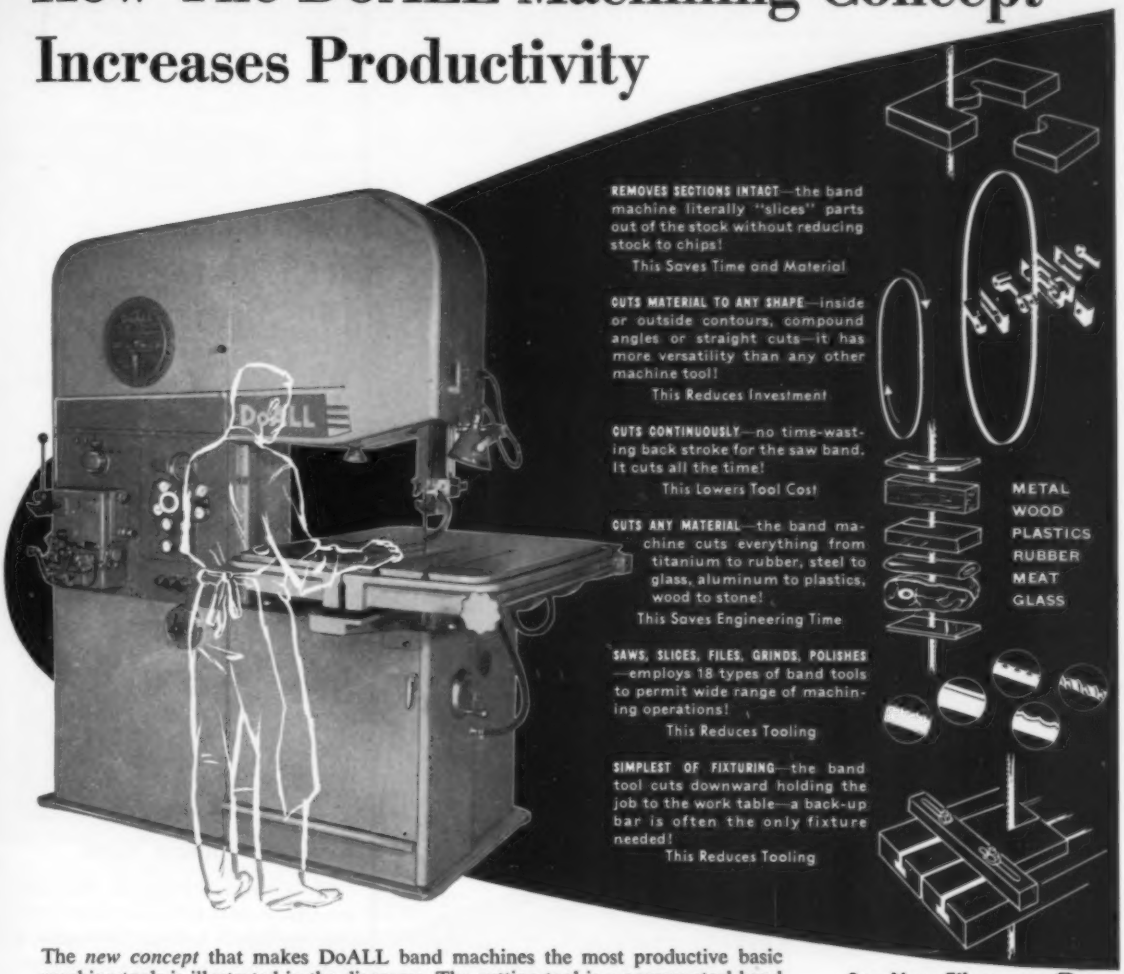
Four versions of the machine have been developed, designated the P60S, MH100S, MH150S, and MH175S. The numeral in each case indicates the maximum diameter, in inches, of the gear which the machine can accommodate.

Vertical traverse of the hob slide is effected by a leadscrew of 4½ inches in diameter, ½ inch in pitch which is mounted centrally between the guideways; these are relatively narrow to give increased precision.

When the machine is required for shaving, a special attachment is mounted on the hob swivel slide to replace the hob. This conversion unit comprises a shaving cutter, mounted on a large hardened and ground spindle, which is carried in precision taper roller bearings. The attachment is centrally located and bolted to the swivel slide. Swivelling of the cutter to the crossed axis angle required is achieved by power or by hand.

A major factor in achieving maximum precision is the provision of a fine pitch master dividing worm wheel for hobbing and a single helical wheel for fast rotation and for shaving. **(David Brown Industries, Ltd., Britannia Works, Sherborne St., Manchester 3, England).**

How The DoALL Machining Concept Increases Productivity


REMOVES SECTIONS INTACT—the band machine literally "slices" parts out of the stock without reducing stock to chips!
This Saves Time and Material
CUTS MATERIAL TO ANY SHAPE—inside or outside contours, compound angles or straight cuts—it has more versatility than any other machine tool!
This Reduces Investment
CUTS CONTINUOUSLY—no time-wasting back stroke for the saw band. It cuts all the time!
This Lowers Tool Cost
CUTS ANY MATERIAL—the band machine cuts everything from titanium to rubber, steel to glass, aluminum to plastics, wood to stone!
This Saves Engineering Time
SAWS, SLICES, FILES, GRINDS, POLISHES—employs 18 types of band tools to permit wide range of machining operations!
This Reduces Tooling
SIMPLEST OF FIXTURING—the band tool cuts downward holding the job to the work table—a back-up bar is often the only fixture needed!
This Reduces Tooling
METAL
WOOD
PLASTICS
RUBBER
MEAT
GLASS

The *new concept* that makes DoALL band machines the most productive basic machine tools is illustrated in the diagrams. The cutting tool is a narrow steel band with hundreds of tool points—suspended between widely spaced tool holders. Hence the scope of its cutting action is not restricted. It is the world's fastest method of machining from solid steel. Everyday machining operations like slotting, notching, trimming, angular contour cutting, etc., as well as making special parts, can be routed to the DoALL Band Machine to gain enormous savings over former machining methods.

In addition, there is little or no waste of material or consumption of engineering time for fixturing and tooling with special machines.

And now this profitable machining method has a spectacular new cutting tool in the DoALL Demon *High-Speed Steel* Saw Band. There is no machining rival for its performance on DoALL Contour-matics. Cutting rates are up to ten times faster with up to thirty times longer cutting life.

We sincerely urge you to get the facts by calling your local DoALL Store. They will arrange a personal inspection demonstration of this machining concept in your plant. No obligation of course . . . it is our privilege to serve your machining needs.

THE DoALL COMPANY Des Plaines, Illinois, U.S.A.

Makers of Band Machines and Blades . . . they go together

See New Films—

revealing this new concept for cost reduction in machining. "Production Band Machining" 30 minutes. "Production Tooling" 10 minutes.

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Fundamentals of Economics in this age of machines and power are described in this Educational Wall Poster. Write for free copy.

Demon and Contour-matic are registered trade marks of The DoALL Company.

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DoALL GAGE BLOCKS
DoALL GRANITE SURFACE PLATES
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B-26

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Mexico, D.F. • Midland, Michigan, U.S.A. • Cable: Dowpanam

Copy-Turning Attachment

A hydraulic copy-turning attachment, the Carstomat, is suitable for fitting to small center lathes, between 4¼- and 6-inches center height.

The attachment is hydraulically actuated, the tool slide being placed at an angle to the lathe center line and feeding the tool away from the work axis. The attachment is secured to the cross slide, which travels at a constant feed. Workpieces with vertical faces can be copy-turned, together with internal and external tapers. **(Arthur Carstens & Co., Hamburg 48, Germany).**

•

Armour Protects Tires

Close-mesh chain-mail type tire guards protect tires of road-building machinery against damage and skidding and provide greater traction. Made of high tensile manganese steel, they are light in weight and easily installed. The chain's resiliency permits a self-cleaning action. **(Rud-Kettenfabrik, Rieger & Dietz, Unterkochen/ Wuerttbg, Germany)**

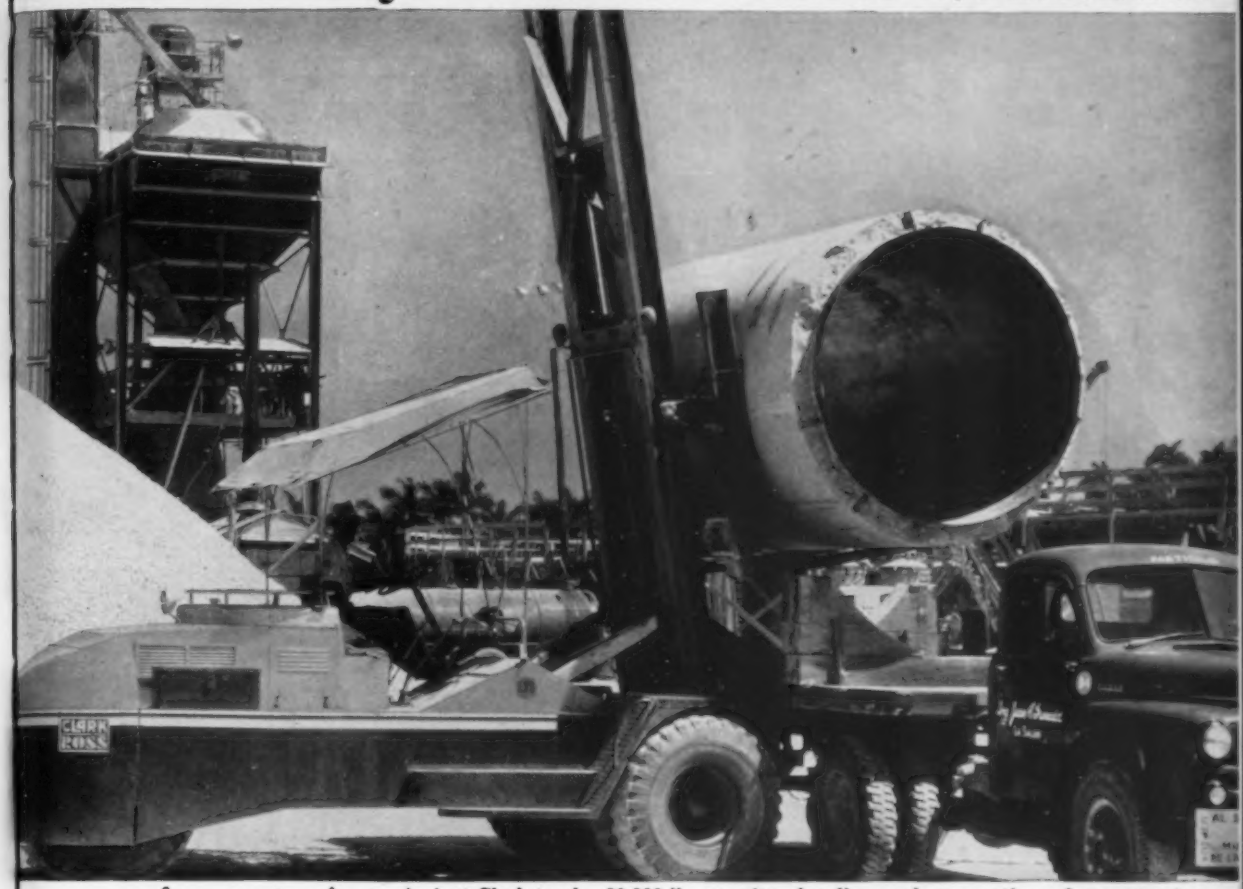
•

Finds Flammable Gas

A new line of portable instruments detects and measures flammable gases and vapors.

One of the principal features is compactness: instruments weigh only six pounds. Power to operate them is supplied by eight dry-cell flashlight batteries, providing 10 to 11 hours of continuous service. **(Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.)**

CLARK EQUIPMENT moves mountains

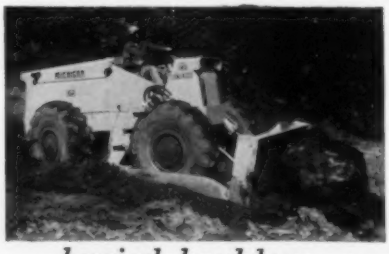


. . . of concrete pipe A giant Clark truck—30,000-lb. capacity—handles ponderous sections of concrete pipe for the new Havana National Aqueduct Project, Cuba. This machine is the largest in Clark's broad line of lift trucks which range in capacity all the way from 1,000 lbs. to 30,000 lbs. There's a Clark truck to meet every handling requirement, large or small.

. . . steel slabs Two of these 45,000-lb. capacity CLARK-ROSS Carriers cut the cost of transporting steel slabs for a major German steel producer.

. . . red-hot slag This diesel-powered MICHIGAN Tractor Shovel removes red-hot slag as it runs off from the melting furnaces of a large Canadian steel company.

. . . sewer trenches A rugged MICHIGAN backhoe cuts through heavy clay to dig sewer trenches for a new housing development in southern United States.



. . . buried boulders When the MICHIGAN Turbo-Dozer went to work on it, a 2-ton boulder was completely buried in the ground. It took just 5 minutes to "root" it out.

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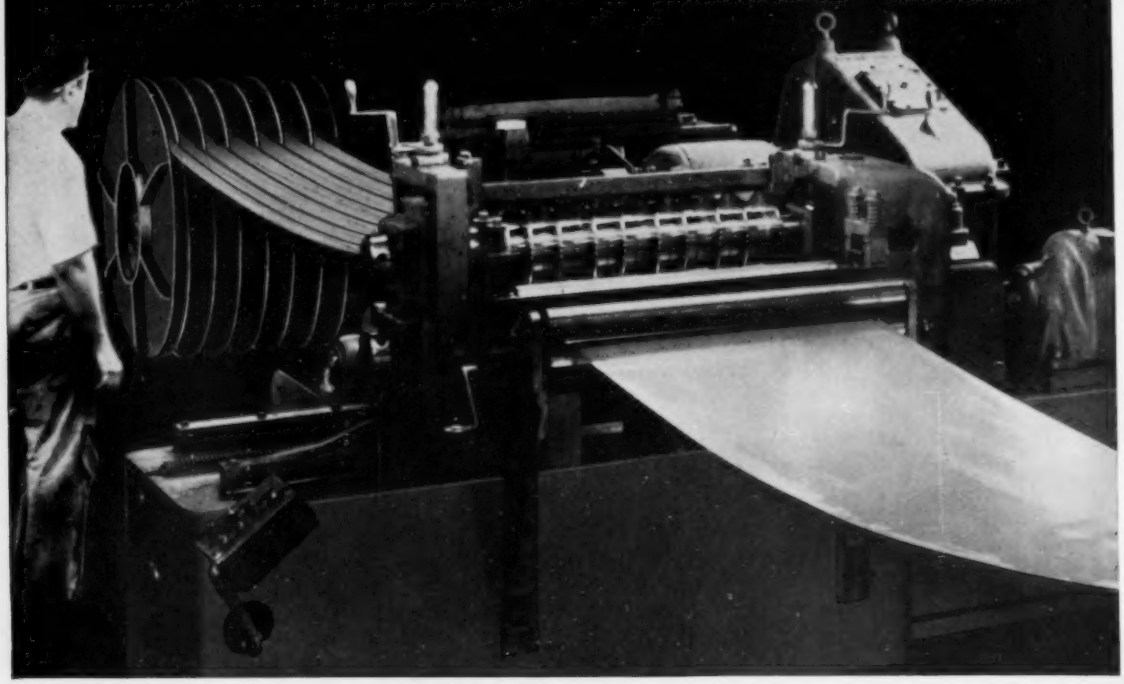

...with big savings possibilities

The Yoder Slitter Book contains time studies, production records, and other valuable data on the economics as well as mechanics of slitter operation. A copy is yours for the asking; also estimates and recommendations.

The standardized series of Yoder Uncoilers, Slitters and Recoilers make possible an infinite number of combinations for highly efficient coil and sheet slitting.

At a substantial saving in first cost, one of these combinations will meet widely varying production needs of fabricating shops as efficiently as higher priced, built-to-order equipment (also designed and built by Yoder) for very big tonnage requirements.

A Yoder standardized slitting line is a most profitable production tool which will pay for itself in short order on strip requirements as low as 100 tons per month, even less. Equally important is the ability in a few hours to meet expected and unexpected needs for slit strands, from a relatively small stock of standard width coils. This greatly reduces strip inventories and simplifies production planning.

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Model 109 winding machine automatically winds electrical resistance wire on continuous lengths of core material from 300 foot or larger capacity spools. The wire-wound core can then be cut and made into flexible wire-wound resistors, heating elements and coils for other applications.

Winding speed is up to 6,000 revolutions per minute with variable-speed series motor for wire sizes ranging from 0.003 to 0.012 inch. Tension is controlled by a special adjustable spring device which is part of the machine. Unit is made by the George Stevens Manufacturing Co. **(Scheel International Inc., 4237 N. Lincoln Ave., Chicago, Ill.)**

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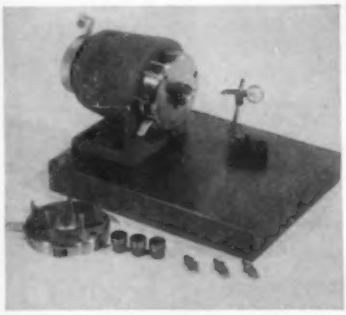

Gages Precision Parts

A new gaging fixture can be used wherever extreme accuracy is required in threaded parts. It provides an inspection range from ¼- to 1½-inches thread diameter. Inherent accuracy is approximately 0.0002-inch total indicator reading, at 1½ inches diameter.

Used in conjunction with an ordinary dial indicator, the fixture consists basically of a gaging head mounted on a precision aligned spindle. Special ball thrust bearings insure squareness. In operation, a lever arm is actuated, opening the gaging rolls carried on the gaging head.

The product thread is placed on the rolls and the arm is released. The spindle and head are rotated by means of a hand crank and errors in squareness are easily read in terms of total reading on the indicator dial. **(Pratt & Whitney Co., Inc., West Hartford 1, Conn.)**

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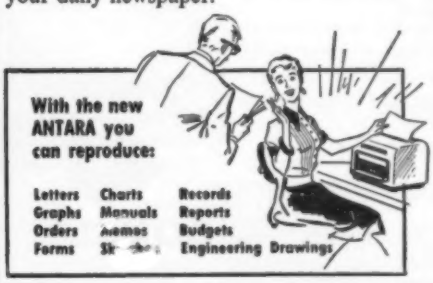
Also for industrial use: the large desk-top model, the ANTARA **O-M** . . . copies up to 16" wide (40 cm.) . . . or the upright model, the ANTARA **Streamliner** . . . copies up to 42" wide (106 cm.).



For further information write: Antara, Diazo Division, General Aniline & Film Corporation, Johnson City, New York, U.S.A.

ANTARA representatives are near you: LONDON, Ozalid Company, Ltd.; PARIS, La Cellophane S. A.; MILAN, Marri, S. R. L.; TEL AVIV, Eng. Joseph Lowenstark; BERNE, Multitec S. A. Berne; BRUSSELS, Etablissements Raoul Simon; OSLO, A/S Torrkopi; STOCKHOLM, Georg Rolle A/B; ISTANBUL, Burla Biraderler Ve Ssi.; ATHENS, Basil C. Lambiris; LISBON Portugal, Lima Mayer & Cia. REYKJAVIK, Einar J. Skulason; MANILA, Engineering Reproductions, Inc.

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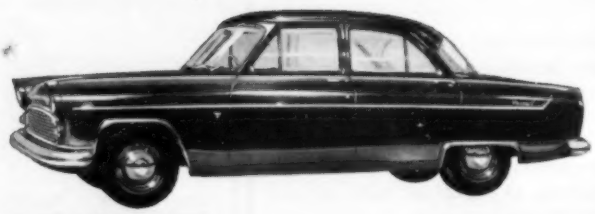

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The Cruiser Crane, Model 205, is best suited for odd job service around industrial plants, for municipal and utility service, in warehouses and storage yards, and in large area installations where handling equipment must be shifted quickly from one job location to the next.

Operated by one man, the Cruiser has a 15-ton capacity, ½ cubic yard dipper capacity and a top travel speed of 21 miles per hour for fast shuttle operation. **(Koehring Co., 3026 West Concordia Ave., Milwaukee 16, Wis.)**

●

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Completely new six-speed automatic transmission, which includes a hydraulic retarder to make better use of engine braking and power take-off openings, is the main feature of the new line of Chevrolet trucks.

The new Powermatic transmission makes use of a torque converter in series with a six-speed hydraulically-controlled gear box. For best fuel economy, the torque converter is locked out under certain conditions. There are three ranges—Drive, Intermediate and Low. **(General Motors Overseas Operations, 1775 Broadway, New York 19, N. Y.)**

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▶ YOUR MANAGEMENT READING

Management Digest's editorial staff here again does the "worthwhile reading" for you to save your time. For the following literature, please write directly to the addresses given.

Human Relations In Leadership—"The New Psychology for Leadership" is a non-technical book that will tell you how to improve your personal leadership in the newer light of group dynamics and human relations. Some of the practical aspects of management relations covered are: lessening hostile attitudes in workers, the six major functions of the successful leader, the kind of leader people work hardest for, how to conduct a conference. Price: $4.00. (McGraw-Hill Book Co., 330 W. 42nd Street, New York 36, N. Y.)

Trading with the U.S.A.—Brochure describes the foreign trade services to be offered by San Francisco's soon-to-open World Trade Center. Details on office and display areas available to trading firms and organizations are included. (World Trade Center, Ferry Building, San Francisco, California.)

Planning Better Fire Protection—A complete line of fire hose and extinguisher cabinets for all types of buildings is described in Catalog 55. (Elkhart Brass Manufacturing Co. Inc., Elkhart, Indiana.)

Hints on Office Management—"Company Experience In Improving Office Administration" tells how representatives of an oil company stress employee and supervisor participation in their programs of work measurement and simplification. Price: $1.75. "Searchlight On Office Cost Control" discusses the problems of keeping clerical costs in line. Price: $1.75. (American Management Association, 1515 Broadway, New York 36, N. Y.)

Business Systems And Procedures—"Is This a Blueprint for Tomorrow's Office?" describes the planning of Sylvania Electric Products' Data Processing Center. "Information: What We Want, When We Want It!" discusses the Univac system in the light of recent developments in automation. Article deals with problems which confront management in every business and industry. (Management Controls Reference Library, Remington Rand, 315 Fourth Avenue, New York 10, New York.)

Miniaturization— Booklet explores the concept of miniaturization as a means of cutting a product's weight and size, thus providing more service and convenience to the user. The main advantage lies not always in a smaller, lighter end product, but often in the ability to put more product and service into a given space. For your copy, write on your company letterhead to Standard Pressed Steel Co., Box 788, Jenkintown, Pennsylvania.)

Industrial Accident Prevention—This 1341-page Accident Prevention Manual for industrial operations contains a wealth of information needed to organize a comprehensive safety program—and keep it going. Price: $13.50. (National Safety Council, 425 N. Michigan Avenue, Chicago 11, Illinois.)

The Publisher Says . . .

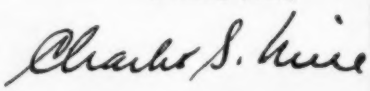
You can divide the articles we publish into two very broad categories. The first group endeavors to present important trends in international business, trends that may affect you directly, and certainly influence the kind of world you will be doing business in. The article on India's Five Year Plan (page 11) might be an example.

Nothing could be more important to the future of India—and all Asia—than success in this great venture. The future of India as one of the world's largest markets is at stake. Further, India is embarking on the most demanding, complex "managerial" job in its history. India's experiences, as it attempts to build up heavy industry, will provide a case study for businessmen everywhere. We hope in our own future coverage to bring you articles on specific successes (and perhaps failures) under the plan. We hope, as do all India's friends, to have many successes, and few failures, to report.

The bulk of MANAGEMENT DIGEST articles fall into the second category. These, we hope, provide new ideas for dealing with the problems of managing your business. The story on disaster control (Management Methods) might be an example. If you had seen the ruin visited upon many businesses in eastern U. S. A. by last summer's floods, you can appreciate the necessity of being prepared for emergency.

The emergency checklist is designed to stimulate your own thinking about "being prepared." There may be just one idea you can use in it. Yet if that one idea can be used for your future profit or safety, we at MANAGEMENT DIGEST will feel we have done our job, and that you have profited from your subscription.

Sincerely yours,



Publications Digested

McGraw-Hill Publishing Co., Inc.
330 W. 42nd St., New York 36, N. Y.

American Letter
American Machinist
Aviation Week
Business Education World
Business Week
Bus Transportation
Chemical Engineering
Chemical Week
Coal Age
Construction Methods & Equipment
Control Engineering
Electrical Construction & Maintenance
Electrical Merchandising
Electrical West
Electrical Wholesaling
Electrical World
Electronics
Engineering & Mining Journal
E&MJ Metal & Mineral Markets
Engineering News-Record
Factory Management & Maintenance
Fleet Owner
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Industrial Distribution
Ingeniería Internacional Construccion
Ingeniería Internacional Industria
Metalworking Production (London)
National Petroleum News
Nucleonics
Petroleum Processing
Petroleum Week
Power
Product Engineering
Textile World
The American Automobile
Today's Secretary

Advertising Publications, Inc.
20 E. Illinois St., Chicago 11, Ill.
Industrial Marketing

American Bankers Association
12 E. 36th St., New York 16, N. Y.
Banking

American Management Association
1515 Broadway, New York 36, N. Y.
Personnel

American Society for Metals
7301 Euclid Ave., Cleveland 3, Ohio
Metal Progress

Bill Brothers Publishing Corp.
386 Fourth Ave., New York 16, N. Y.
Sales Management

Breskin Publications
575 Madison Ave., New York 22, N. Y.
Modern Packaging *Modern Plastics*

Dartnell Publications, Inc.
4660 Ravenswood Ave., Chicago 40, Ill.
American Business

F. W. Dodge Corp.
191 W. 40th St., New York 18, N. Y.
Architectural Record

The Economist Newspaper, Ltd.
22 Ryder St., London S.W. 1, England
The Economist (London)

Fritz Publications, Inc.
431 S. Dearborn St., Chicago 5, Ill.
The Paper Industry

Harvard University
Soldiers Field Boston 63, Mass.
Harvard Business Review

Industrial Publications, Inc.
5 South Wabash Ave., Chicago 3, Ill.
Ceramic Industry

Keeney Publishing Co.
6 N. Michigan Ave., Chicago 2, Ill.
Heating, Piping & Air Conditioning

Petroleum Publishing Co.
211 S. Cheyenne Ave., Tulsa 1, Okla.
The Oil and Gas Journal

Printers' Ink Publishing Co., Inc.
205 E. 42nd St., New York 17, N. Y.
Printers' Ink

Rubber and Technical Press Ltd.
147 Gosvenor Rd., Westminster, London, S.W. 1, England
The Rubber and Plastics Age

Simmons-Boardman Publishing Corp.
30 Church St., New York 17, N. Y.
American Builder, Marine Engineering, Railway Age, Railway Track and Structures, Railway Locomotive and Cars, Railway Signaling & Communications

Temple Press Ltd.
Bowling Green Lane, London E. C. 1
Plastics, The British Motor Ship

The Times Publishing Co. Ltd.
Printing House Square, London, E. C. 4
The Times Review of Industry

Welding Engineer Publications, Inc.
12 East Grand Ave., Chicago 11, Ill.
Welding Engineer

Index to Advertisers

ALCO PRODUCTS INC.	2
ALLIS-CHALMERS MANUFACTURING CO. Tractor Division	1
ALLIS-CHALMERS MANUFACTURING CO. Industries Group	6
BETHLEHEM STEEL EXPORT CORP.	10
BURROUGHS CORPORATION	4th Cover
CLARK EQUIPMENT INT'L.	49
COMBUSTION ENGINEERING INC.	2nd Cover
DELAWARE RIVER PORT AUTHORITY	26
DITTO INCORPORATED	31
DoALL COMPANY	47
DOW CHEMICAL INTL. LTD.	48
EX-CELL-O CORPORATION	44
FORD MOTOR CO. LTD.	52
GENERAL ANILINE & FILM CORP.	51
GENERAL ELECTRIC CO., INT'L.	33
GENERAL MOTORS OVERSEAS OPERATIONS	54
HARNISCHFEGER INT'L CORP.	28
HITACHI, LTD.	40
HYSTER COMPANY	3rd Cover
LINK-BELT COMPANY	4
MUELLER BRASS CO.	9
NORDBERG MANUFACTURING CO.	27
REMINGTON RAND INC.	42
UNDERWOOD CORP.	53
UNION CARBIDE INTL. COMPANY	25
VICTOR SAW WORKS INC.	29
WALLACE & TIERNAN INC.	32
WESTINGHOUSE ELECTRIC INT'L CORP.	5
YODER COMPANY	50

CONSULTING AND BUSINESS SERVICES . . . 53

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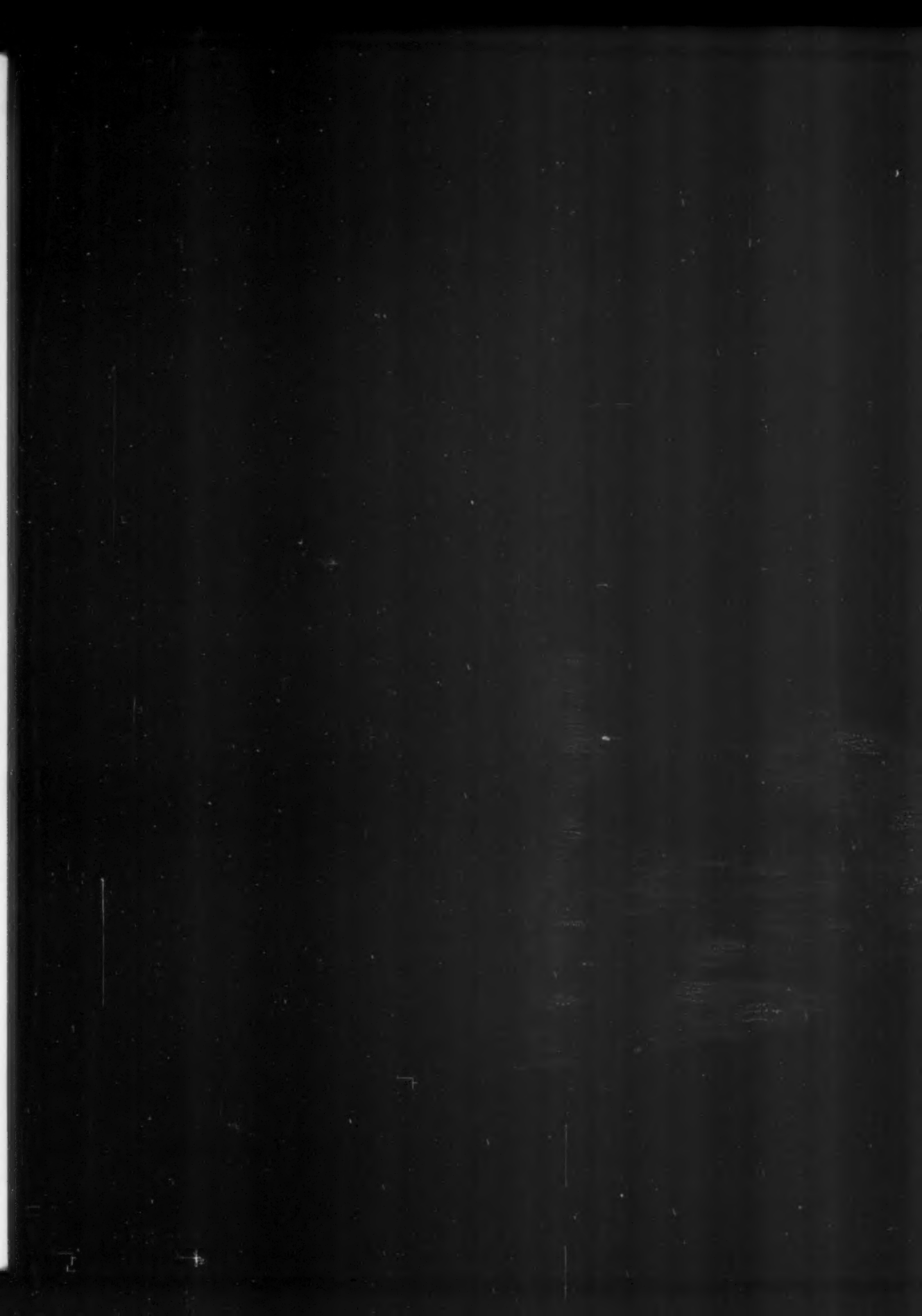
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